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Paul R. DeRensis

CW Photos by E. Holmes

Daniel T. Brooks

Malpractice Menacing Analysts, CLA Warned

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. — If doctors, accountants, lawyers and engineers are vulnerable to malpractice suits, can systems analysts and programmers be far behind?

As "professionals," systems analysts may find themselves open to charges of professional negligence from those who have suffered harm from a faulty system design, Daniel T. Brooks, an attorney with the New York firm of Cadwalader, Wickersham & Taft, told a recent meeting here of the Computer Law Association (CLA).

Even if the job of systems analyst is not yet mature enough to be regarded as a profession subject to public licensing and ethical codes, a systems analyst may find himself liable for systems design if the court views him as it would a manufacturer. Manufacturers are liable for defects in the design of products, and the legal rules governing this area are strict, Brooks said.

The attorney noted that in Michigan and Massachusetts, where a number of computer manufacturers are headquartered, a systems analyst may be open to attack "if he made an innocent misrepresentation" to a user about a system's capabilities.

Programmer Like Tradesman

Because programmers can be defined more clearly as technicians or skilled tradesmen, they are further away from becoming professionals and from encountering malpractice charges. Their tasks are more analogous to those of the airplane pilot, the machinist, the electrician and the plumber, Brooks stated.

Programmers are more likely to be held to the "reasonable man standard" than are systems analysts. The analyst's responsibility for the system de sign and the judgment he puts into it tend to require that he be held "to the minimum level of competence projected by the profession," Brooks suggested.

In addition to raising the question of malpractice by systems analysts and programmers, the increasing use of computer/communications technology will affect the negligence risks that established professions such as law, medicine and engineering already assume, according to Paul R. DeRensis, a lawyer with the Boston firm of Powers & Hall.

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Ruling Due on O'Hare System

Air Controllers Demand Backup

By Marguerite Zientara
CW Staff

CHICAGO — A federal judge here is considering demands by a group of air traffic controllers for a computer backup system and new software testing procedures at O'Hare International Airport.

"The possibility of two airplanes hitting or of having a mid-air collision increases in the first few minutes after the computer fails, when the controller could become disoriented and lose track of his airplanes," according to Richard Scholz, spokesman for the 63 controllers who have made the demands.

The demands were made in a lawsuit filed in 1975 against the Federal Aviation Administration (FAA), the Civil Service Commission and the Department of Labor, Scholz said. The trial took place in January.

Radarscope Display

The Automated Radar Terminal System (Arts III) at O'Hare generates a display that is superimposed on the radarscope, indicating an airplane's airline name and number, ground speed and altitude.

"When the computer fails, we lose that information and the controller must then make the transition to a mental three-dimensional picture to control the airplanes," Scholz said.

Although the computer system, run on two specially built Univac 8303 systems, is 99.9% reliable, Scholz said, it failed on 46 days in 1977, and during the first two weeks of 1978, the computer failed on six days.

According to Scholz, "it fails too many times for short durations." He explained that if it failed 10 times for two minutes each time, it would be much more serious than if it failed once for two days, since it is the transition period from working with the computer to working without it that is dangerous.

Neil Callahan, public information officer for the Great Lakes Region of the FAA, denied that the adjustment period is dangerous. "The radar targets do not disappear. It's just the data block — the information that's associated with the targets — that disappears," he said.

"O'Hare Airport was the busiest airport in the world for 15 years and it never had a data block. There was no such thing. Now there is a data block, but when the data block disappears it doesn't change the situation any at all," Callahan contended.

According to Warren Webber, data systems officer at the O'Hare Control Tower, "The equipment has been very reliable. It's been in for going on seven

(Continued on Page 6)

Distribution System Helps Midwest Bear Coal Strike

By Ann Dooley
CW Staff

CANTON, Ohio — Although the United Mine Workers strike has reduced coal supplies here drastically, most users have experienced only minor energy cutbacks, thanks in part to a process control system that helps distribute area utilities' energy resources.

American Electric Power Co. (AEP) has not been paralyzed by fuel shortages primarily because the company has been able to get nonunion coal and to distribute power from utilities outside the affected areas.

In fact, the coal strike hasn't called for any extraordinary measures at AEP at all; it's business as usual, an AEP spokesman said of the computer system which has been overseeing power distribution since 1963.

American Electric is one of the largest utilities in the country, providing power to seven states from 15 generating stations and 45 generating units along a 765,000 kV transmission line, the largest in the U.S.

The AEP process control system uses an IBM 1800 computer to receive signals from power generators for monitoring the reliability of the high-voltage network. It reads what various plants are generating and then distributes the supply among the participating utility companies depending on power usage criteria, the company spokesman explained.

Power voltage information from area substations is sent over telephone lines

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Grad Admits Using System To Get Phi Beta Kappa Key

By Marguerite Zientara
CW Staff

FLUSHING, N.Y. — A former student at Queens College here has admitted awarding himself unearned Phi Beta Kappa status in 1975 by tampering with the school's computerized grade records system, according to Gene Robbins, assistant to the president of the college. In addition, there exists "hard, irrefutable evidence" that grades were changed for 12 to 15 other students, and it is believed that the same person made the changes.

The grade changes, which were allegedly made between 1974 and 1977, were not discovered until January of this year during a routine manual audit by faculty members, Robbins said.

Every semester, computer printouts of grades are sent to every faculty member to be checked against their own grade books. "The problem is that you're talking about a big population here and you can never guarantee that 100% of our 1,200- to 1,500-member faculty is going to go through all the grades. It could just be that the grades they checked [in the past] were cor-

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Please address all correspondence to the appropriate department at 797 Washington Street, Newton Mass 02160 Phone (617) 965-5800 Telex USA-92-2529

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For Leaking Customer's Data

Burroughs Loses $3 Million Suit

By Tim Scannell
CW Staff

GENEVA, Ill. — The Quad County Distributing Co., a wholesale beer distributor here, was awarded $1 in actual damages and $3 million in punitive damages after a jury found Burroughs Corp. guilty of divulging confidential information.

Burroughs intends to appeal the verdict, however, because the amount awarded to Quad "had no relationship between the actual damages and the punitive aspect" of the alleged disclosure, according to Edmond K. Lech, a Burroughs spokesman.

The information divulged was confidential "dock prices" — or the amount Quad pays a brewery for its beer, Wendell Clancy, an attorney for the beer firm, stated. "There are only two or three people in the world who knew what the price was," Clancy said..

Burroughs disclosed privileged reports containing prices and figures from Quad's records in the process of demonstrating similar software to a competitive beer distributor, Clancy stated.

Discovery of Leak

The disclosure was discovered by a Quad vice-president "who was having a conversational lunch with a competitor," Clancy explained. The competitor jokingly mentioned that he was aware of Quad's dock prices and "he gave [the vice-president] three of them, one of which was the confidential one," the attorney said. Coincidence was ruled out because the competitor quoted the price "to the last decimal point," he noted.

Evidently, Burroughs "kept some of our information at its district office for debugging as it was going through the formulation of these programs," Clancy said. The information was apparently loaded onto a disk that was used to demonstrate the programs to Quad's competitor.

Burroughs will fight the court's decision "all the way," Leach said. "Our opinion is that it will not stand up" because "both the law and the facts will support our position.

"Number one, we don't think we gave away the confidential information; two, if we did give it away, they [Quad] were not damaged; and three, even if they were damaged, they were damaged to the extent of a dollar — not $3 million," Leach said.

Software Suit

In the same action, Quad originated a software lawsuit against Burroughs stating "that Burroughs had failed to provide it [Quad] with software that was functional," Clancy said.

The court ordered Burroughs to pey $18,718 to compensate Quad for the "additional programming required . . . and additional wages and salaries paid to . . . employees hired as a result of breaching the oral contract" entered into by the defendant, according to the court transcript.

Quad had to recruit the services of an outside software firm to reconstruct its programs because the Burroughs written contract covered it "against assuming any responsibility or risk whatsoever," Clancy stated. "We had to completely throw it [software] out and start all over again" with a new supplier who gave Quad a whole system from scratch, he said.

Burroughs contends that the alleged oral contract was entered into by a Burroughs employee subsequent to signing a written agreement with Quad to supply hardware. "Ordinarily, my argument would be that the salesman [dealing with Quad] didn't have the power to enter into such an agreement," Leach stated.

Although Burroughs is also appealing this aspect of the suit, it has dismissed it as "a minor part of the case" and "insignificant next to the $3 million," Leach said. Burroughs intends to concentrate on reversing the court's decision regarding the amount for punitive damage because "it looks to us like a type of windfall for the plaintiff [Quad] to which it's not entitled," according to Leach.

"When a jury decides something, you never know precisely what they're deciding on," Leach remarked. "Sometimes they come up with a figure nobody can find any basis for" because there is no way of knowing just "what goes on inside of a jury room," he noted.

In Quad's opinion, the jury awarded it $3 million not only to punish Burroughs but to deter the entire industry from doing that sort of thing, Clancy remarked.

"It was very easy . . . to get [the jurors] to identify with the fact that there's an awful lot of data and information in the hands of the computer industry which is germane to them" and which should remain confidential, Clancy said. "They didn't think that anybody should be allowed to go around and disclose [this information] without at least asking for consent," he added.

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Most Important U.S. Witness

Issue of Bias Tinges McAdams' IBM Testimony

Analysis

By Catherine Arnst
CW Staff

NEW YORK — After a record-breaking 74 days of testimony, Dr. Alan K. McAdams, the government's chief economic advisor for the U.S. vs. IBM antitrust trial, left the stand last week. As the person with the mission of interpreting and evaluating the past two years of evidence — or 60,000 pages of transcript — McAdams was the government's most important witness.

A professor of economics at Cornell University, McAdams is the government's main expert witness for this case. His direct testimony took 30 days and filled 4,200 pages of transcript, while the IBM legal team used 35 days and 4,400 transcript pages cross-examining him. The other nine days were taken up by redirect and recross-examination.

The main theme of that cross-examination was the witness's purported bias, and IBM lead attorney David Boies did not have to work very hard to prove it. McAdams was basically an advocate for the government's point of view, Boies argued; at least two other witnesses in the trial have called him a "zealot."

Boies observed that, although there is nothing wrong with advocacy in attorneys, higher standards should be demanded from an expert witness: "With McAdams, all you were getting was a partisan argument."

McAdam's role, in part, was to sum up the government's case; indeed, some observers claimed his testimony resembled a closing argument. He is probably the man most qualified to play such a role because he has worked with the government trial staff in some capacity since October 1972.

McAdams first became involved with this litigation as a staff member of the President's Council of Economic Advisors when he was asked to analyze the government's case and then, in the pretrial discovery stage, to determine its merits. By September 1975, he was working full-time for the Department of Justice as a consultant for the case and was designated an expert witness.

The purpose of an expert witness is to give an independent analysis of the issues and evidence. But not only did McAdams study the evidence the government presented, he also helped choose which evidence was presented. He became, in effect, a de facto member of the trial staff, and some observers said he was the de facto leader.

Raymond Carlson is the Justice Department attorney in charge of the government's direct case, but McAdams appeared to be the strategist. "It became — I don't want to sound all that positive — it became evident to me, though . . . that there was some kind of a, well, power vacuum and McAdams postured himself to fill that power vacuum . . . there's no strength of leadership that comes from Carlson.

"You do, however, get that sense when you begin talking with and about and to McAdams," Larry Welke, president of International Computer Products, Inc. and a government witness, has said (see related story on Page 5).

McAdams helped draft the government's pretrial brief, its statement of triable issues, "the economic analysis of the market for general-purpose electronic digital computer systems" and the amended complaint.

He or a member of his staff was present at the pretrial interviews, depositions and court testimony of virtually all the government witnesses. A trademark of the government's examination of witnesses was the sight of McAdams handing notes to the attorneys with questions they should ask.

Government attorney Lewis Bernstein defended McAdams' immersion in the case on the grounds that only by devoting such time and attention could he do a thorough analysis of the industry. The drawback, however, is that he became part of an effort against IBM and his testimony was meant to further that effort.

Consequently, the strength of McAdams' analysis and conclusions, and there were many, was diluted.

Strong Analysis

In his cross-examination of McAdams, however, Boies could not do much substantive damage to the validity of the facts on which McAdams based his analysis. The main thrust of the defense was to emphasize that McAdams drew many of his conclusions from the testimony of government witnesses who were obviously biased against IBM, such as Memorex employees involved in that firm's antitrust suit against IBM, now in progress on the West Coast.

But McAdams' testimony, like the government's case, depended more on internal IBM documents than trial witnesses, and Boies could do little to soften their impact.

The documents — more than 4,000 of them — were for the most part written by top IBM executives and contain descriptions of the actions and strategies the government claims are anticompetitive. They are generally considered to be the strongest evidence in the government's case, and McAdams quoted from them at length.

Where Boies may have scored points, however, was in his efforts to show that McAdams relied on evidence that supported his conclusions and to some extent ignored that which contradicted those conclusions.

IBM in part based its mistrial motion [CW, Jan. 9] on McAdams' method of "selective reinforcement." Throughout the trial, corporate executives defined in several different ways the general-purpose computer systems market and testified in ways that differed from McAdams' definition of that market — a key issue in the case.

Although McAdams relied heavily on these witnesses for information pertaining to IBM actions in the general-purpose computer systems market, he considered their definitions of that market irrelevant to his analysis, he said.

With other testimony, McAdams would be unable to recall readings that disagreed with his conclusions, although he showed an amazing memory on direct examination. For example, he testified under direct examination that the design change in the IBM Model 3420 tape drive, which offered a digital interface, offered users no advantages over the analog interface used with the Model 2420.

However, testimony in the Telex vs. IBM trial contradicted that assessment, with witnesses stating that a digital interface offers a clearer signal and greater reliability than an analog interface. Although McAdams testified that he or a member of his staff had reviewed all the "substantive" portions of the Telex record, he could not recall reviewing that particular portion.

Dispute Over Theories

Another weakness in McAdams' analysis, and what some observers see as a weakness in the government's case, is the fact that there are many prominent economists who would disagree with McAdams' theories and methods of analysis. Economics has been called "the dismal science"; it is also a disputed science.

One such dispute exists over McAdams' method of using cash flow as a measure of a firm's profitability. Statements issued by the Accounting Principles Board warn that "misleading implications" can result from the use of cash flow statistics "which are not placed in proper perspective to net income figures and to a complete analysis of source and application of funds."

Other economists also dispute the use of cash flow as an indicator. McAdams, however, maintained that it is an appropriate method for his purposes.

McAdams also disagreed with a Harvard Law Review article on predatory pricing by Professors Donald F. Turner and Philip Areeda. He charged that some of the conclusions were misleading and the analysis was poor.

However, both authors are noted lawyers and economists, and Turner will probably offer just as many reasons in defense of his article when he testifies in this case for IBM.

The lack of agreement among economists regarding McAdams' testimony is analogous to the lack of agreement about the government's charges. Most analysts agree that IBM dominates the computer industry and that it is a large and successful company.

Whether that dominance and success should be considered monopolization is a question which leads to heated disputes — particularly this very long and extensive one in New York. And there are a long string of experts yet to come who will take the stand to keep that dispute alive.

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Witness Says McAdams 'Affected' Testimony

By Catherine Arnst
CW Staff

NEW YORK — A government witness has charged that his testimony was "affected" by conversations with Dr. Alan McAdams, the government's chief economic advisor on the U.S. vs. IBM antitrust case.

The witness — Larry Welke, president of International Computer Products, Inc. of Indianapolis — was on the stand for eight days in April and May 1976. He made the accusation in a September 1976 interview with IBM attorneys from Cravath, Swaine & Moore.

The interview was given without the government's knowledge and Welke's remarks were not made under oath. In the interview, Welke claimed that during discussions with the government before his testimony, McAdams "unnecessarily probed and prodded" him to the point where "I got the feeling of being, well, harassed."

IBM attorney David Boies used the Welke interview during his recent cross-examination of McAdams in an attempt to impeach McAdams' conclusions concerning IBM's alleged anti-competitive actions — conclusions that McAdams claims to have based in large part on the testimony of government witnesses.

Long-Time Advisor

The interview with Welke was sought after a *Computerworld* article [CW, June 21, 1976] quoted Welke as stating that "McAdams is running the strategy for at least the unbundling part of the trial." In his cross-examination of McAdams, Boies attempted to show bias on McAdam's part because of his involvement with the government trial staff.

McAdams has maintained that his deep involvement with the government's case did not influence his objectivity and that his conclusions concerning IBM were based on a fair appraisal of the record. IBM's strategy during its cross-examination of McAdams was to show that he actually shaped that trial record and only considered the portions that meshed with his preconceived conclusions.

'Designed Attack'

Welke, although a government witness, agreed with that appraisal in the post-testimony interview he gave IBM attorneys. Although Steven Woghin conducted Welke's direct examination in court, in early discussions "[McAdams] was designing the attack and the approach of everything that they were trying to get from me," Welke said in that interview.

Welke claimed that one of McAdam' tactics was to ask a question repeatedly if the answer was not satisfactory "There's a certain amount of that that is normal, that's just examining all aspects of the situation, but there is a point where you get past that and where by credibility, I felt, was being questioned, and that gets to the point of being harrassment," he said.

After being asked one question 14 times, Welke decided McAdams "was looking for something, and it wasn't a question of my trying to teach him or share any knowledge with him. He very definitely had his mind made up."

When confronted with the Welke interview in court, McAdams said, "I do not believe [Welke's] perception is accurate" and contended some of the words Welke quoted McAdams as saying were inaccurate. McAdams recalled that Welke resisted answering several questions "because he didn't understand the context" and "he seemed to think [the questions] were driving at something they weren't driving at."

Welke was considered by several observers to be a very poor witness for the government because he contradicted his deposition and direct examination testimony while on cross-examination. Judge David N. Edelstein questioned Welke at the time about conversations he had had with members of both legal teams, possibly in an attempt to learn if any pressure had been applied. He also asked both sides to read Welke's testimony carefully "and then we will decide what steps to take next."

There was some discussion of perjury charges, sources said, although nothing was ever charged in court. Government attorney Lewis Bernstein asserted that McAdams did not base any of his conclusion on Welke's testimony, however.

After reviewing the IBM interview with Welke, Edelstein suggested the existence of "a pattern of one who is trying to play on both sides of the court and yet not getting in the center."

Bernstein objected to the use of the interview except in a very limited sense and asked Edelstein to issue an order prohibiting IBM from publicly releasing the contents without application to the court "because it is conclusionary and in unsworn form.

"The government would have no objection if IBM would call Mr. Welke and have Mr. Welke make those statements and then permit Mr. Welke to be cross-examined on those statements, and then have Dr. McAdams give his testimony with respect to it. That, I believe, is the fair and just way to do this since reputations are at stake, and the question of veracity is at stake," Bernstein said.

Edelstein denied the government's request for an order to seal the interview, but said he would not admit it into evidence unless IBM called Welke back.

Attorneys for IBM are "undecided" about whether to recall Welke to the stand.

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COMPUTER ASSOCIATES

FBI Message-Switch Plans Never Had GSA Clearance

CW Washington Bureau

WASHINGTON, D.C. — The General Services Administration (GSA) said it never gave the Federal Bureau of Investigation permission to solicit vendor proposals for a telecommunications system that would permit the switching of criminal justice information between state and local law enforcement agencies.

The only authority bestowed on the FBI by GSA was for a request for proposal (RFP) for minicomputers to replace the bureau's two IBM 2703 communications controllers, a GSA spokesman said here last week.

That authority was recently suspended following the public protest of Rep. John E. Moss (D-Calif.), who does not want to see the National Crime Information Center (NCIC) endowed with message-switching capabilities until privacy and civil liberty concerns have been resolved [CW, March 13].

In a March 10 letter to Jay Cochran, assistant director of the FBI's Technical Services Division, GSA Commissioner of Automated Data and Telecommunications Service Frank Carr directed the bureau to "return unopened" the vendor proposals it received for the telecommunications processors.

The suspension of authority to acquire the minicomputers does not extend to requests made by the FBI last October to procure 40 cluster terminal sets and 60 data terminals, the spokesman stated.

The FBI contended its RFP was proper because it informed prospective vendors that while it wanted to see the message-switching capability included in any proposals as an option, the bureau did not yet have authority to install message switching.

GSA said, however, that it had instructed the FBI to delete all mention of message switching from the RFP.

Judge Considering Demand For O'Hare Backup System

(Continued from Page 1)

years and we've really had little trouble with it. When it goes down, it's usually for a few minutes, up to about half an hour.

"It's the memory sometimes, sometimes a board, sometimes it's programming. There's no particular problem with the equipment. Of course, you know, every time it goes out it's played up quite a bit, just like anything else in aviation. It's much more reliable, in my opinion, than most systems," he said.

Backup System on Order

Webber described a backup system now on order for O'Hare and due to arrive in August. He said that two more Univac systems — formerly known as Input/Output Processors will be installed and that the present two will be "modified to do the same things as the new ones.

"With four, they will all run simultaneously, but there will be fallback and fail-safe considerations," Webber said. "Two could go out and you could reconfigure and recover within six seconds, almost simultaneously," he said.

"Six seconds doesn't mean too much, really. Even when people say in six seconds a plane moves pretty far — that's true, but in six seconds I don't think that would cause any problems. Since the radar turns at one sweep every four seconds, one and a half sweeps would be missed at most," Webber said.

"I'm very satisfied," he continued. "I think it's going to be just what we need, that is if it works the way the contract says it's supposed to work."

Scholz agreed the enhancement package will give greater reliability, but, he said, "it will not guarantee a fail-safe situation and our suit said we think we should have a fail-safe situation at this airport because of the number of people who are flying in and out of here." O'Hare Airport is considered the busiest airport in the world with a volume of 2,400 airplanes per day and 850,000 airplanes per year.

Scholz said the issue boils down to one of money. "The cost to research, develop, build and put in a complete new computer — one that would not do anything except sit there and wait for the other one to fail — would be tremendous compared with the cost of what [the FAA is] doing," he said.

"If 400 people were killed in a collision, the public would want to know why and if it was because of a computer failure, I don't think anyone would argue with us that maybe we do need a backup. But because nobody's been killed, [the FAA] wants to save money," Scholz contended.

Software Tests

The second DP-related demand of the suit was for more effective testing procedures for computer software. The FAA mandates that the software program be updated nationwide twice a year, Scholz explained. When the program is updated, it is tested on various computer systems around the country, but according to Scholz, there is no facility to test it at the peak traffic conditions O'Hare experiences.

"When it comes here, the computer is run during the midnight shift to see if it loops properly and goes through the program, but they're testing it at 10% of normal traffic conditions," Scholz explained. If it tests properly for a 10-day period, it is then put on the computer, and "usually — almost every time — it has a rash of failures for the first month until they get the bugs worked out of it, because it was not properly tested," he contended.

"They test it to the best of their ability, but they need a new testing program so we don't have these rash of failures," he said.

Scholz expects a decision within six months. "We're optimistic," he said. "We think we proved our case beyond any shadow of a doubt. The FAA does not argue with our facts and figures."

The suit also seeks a 32-hour work week for O'Hare air traffic controllers, a halt to the present understaffing of journeyman controllers at O'Hare and an update of the training program and procedures that require journeyman controllers to spend so much time training people.

Distribution System Buoying Midwest

(Continued from Page 1)

to three Hewlett-Packard Co. 2116B minicomputers, where the information is collected and relayed by microwave to the IBM 1800 at the computer center here.

The 1800 is programmed to validate the data. If the voltage flowing through the lines doesn't correspond to what it should be, the system can determine if an error has occurred and checks to see if a transmission line or a piece of equipment is malfunctioning.

Dispatch Facility

In addition to the reliability programming, the AEP system is able to determine what voltage goes where through its economic dispatch programming.

The system keeps track of the power demand for all power plants and satisfies the demand using that total figure.

The system is programmed to determine the most economical way to distribute power supplies. It processes data such as what power plants can produce the largest quantities, which can do it most cheaply and any changes in plant performance characteristics or transmission losses. Then it determines each plant's generating output, a spokesman said.

In a single microwave relay, the system can indicate to a power plant whether to generate more or less power, according to the spokesman.

The power plants use telecommunications to relay their power supply requirements directly to the IBM 1800 under the economic dispatch program.

The power plants provide constant updates of power requirements and the system determines the supply they will receive after examining such factors as the total generation requirements of the plant, the status of every power plant, the total maximum capacity and the minimum load needed so the plant won't fall behind.

The system can also interchange between one of its participating power companies and an outside company if that outsider wants to buy power. The system can determine if AEP has the capacity, how much it would cost and whether it would be worthwhile for the company to sell the power.

The computer can also use simulation techniques to project long-range demand for coal, the spokesman said.

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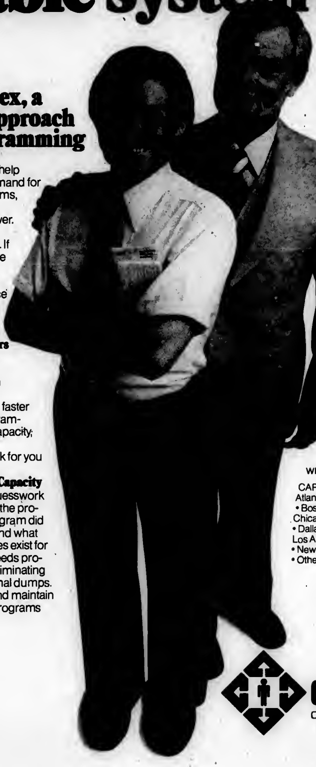

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NBS Asks $13 Million To Fund Standards Work

WASHINGTON, D.C. — Assistant Commerce Secretary for Science and Technology Dr. Jordan J. Baruch has asked Congress for "a major increase in resources" — $13.4 million and 33 positions — to enable the National Bureau of Standards (NBS) to do its duty in developing federal computer and communications standards.

Nearly $11.7 million of the funds earmarked for standards work would go to outside contractors, Baruch told the House Appropriations Subcommittee on State, Justice, Commerce, the Judiciary and Related Agencies here recently. He predicted the overall standards effort could save the federal government $440 million annually.

Appearing before the subcommittee, Baruch buttressed requests for more people and funds made by the acting director of the NBS Institute for Computer Science and Technology, Zane Thornton, before the Senate last month [CW, Feb. 27].

Baruch referenced the law that gave NBS standards-making authority in the federal information processing field, Public Law 89-306, better known as The Brooks Act. The law "envisioned substantial savings to the federal system if such standards could be put into place, and the potential for these savings is stronger now than ever before," he said.

"To implement the act in the spirit intended, a substantial effort at NBS must be undertaken and it simply cannot be done without the resources. There is no question that this is a sound investment that should not be delayed any longer," the assistant secretary of Commerce stated.

Baruch also promised hearings on the I/O channel interface standard under consideration for final approval by NBS will be held on the proposed standard this spring.

Grad Admits DP Tampering

(Continued from Page 1)

rect," he explained.

The central figure in the situation, whose name the college refused to release, was Queens College student during the 1974-75 academic year, when he worked part-time in the school's registrar computer area, Robbins said. After graduation, he became a full-time Civil Service employee, still working in the DP area for the school.

"The employee of the college resigned on the spot when confronted with the situation," Robbins said, and "he has acknowledged he tampered with his own grades."

According to Robbins, grades were changed for a number of students in the fall semester of 1976 and the spring semester of 1977, when the alleged perpetrator was a Civil Service employee. "There is no evidence that he did anybody's grades but his own while he was a student," Robbins said.

No Word on Method

Sy Fischthal, Queens College DP manager, was reluctant to discuss the manner in which the grades were changed. "It jeopardizes [the employee's] situation and also jeopardizes the system to a certain extent, although we have put further checks on the system. For the coming semester, it'll be a totally new system," Fischthal said. "At this point I don't feel it proper to go into it."

The grade records system runs on an IBM 360/40. After the manual discovery of the grade changes, the computer was used to test several files against each other in a quest for possible additional misrepresentations.

According to Robbins, the central figure will be withdrawn from Phi Beta Kappa and could possible have his degree revoked. "We cannot take away his degree because he tampered with his grades if in fact the grades were good enough to warrant his getting a degree in the first place," Robbins said.

Possible Penalties

In the case of the other students involved, a campus investigating team will determine whether each student should go before the Disciplinary Committee and/or the Committee on Scholastic Standards. The scholastic standards committee will determine guilt or innocence relative to the grade situation only.

The Disciplinary Committee could levy such penalties as rescinding a student's degree, reinstating the student's original grades, requiring the student to take a makeup exam for every contested grade, suspending the student or terminating the student's affiliation with the college.

The findings of the college's investigation to date have been sent to the New York City Bureau of Criminal Investigation by the university's legal office. The bureau is investigating the case jointly with the Rackets Bureau of the Queens County District Attorney's Office.

New York City Commissioner of Investigation Stanley Lupkin, who is heading the probe, explained, "If, hypothetically — and I don't want to give anybody the impression that these are the facts — someone with access to a computer terminal or for that matter on a manual basis were to solicit money or agree to accept money in return for changing grades, that would constitute a crime.

"If in fact there is someone responsible for this particular activity, even if money didn't change hands, it is arguable that that person was acting in a manner that would constitute official misconduct, which itself is a penal prohibition," Lupkin said.

It would be impossible to predict when a decision might be reached, he added. According to Robbins, the information so far indicates that "no compensation of any kind changed hands.

NBS Offers Free Programs For Testing Minimal Basic

By Don Leavitt
CW Staff

WASHINGTON, D.C. — Test programs and documentation for Minimal Basic are being distributed by the National Bureau of Standards (NBS) with hopes they will be reviewed and commented upon by government officials, vendors and software developers.

The tests are available free to almost anyone who has two magnetic tapes to spare, but NBS would like to have the comments by the end of July, a bureau spokesman said.

A standard for Minimal Basic, a subset of the Basic language developed at Dartmouth College, has been adopted by the American National Standards Institute and is expected to be adopted by NBS as a Federal Information Processing Standard (Fips).

If NBS makes that move, Basic processors — whether compilers or interpreters — being considered for acquisition or use by federal agencies must comply with the standard. The test programs now being circulated are intended primarily for use by agencies as a means of validating processors being proposed for procurement, the spokesman explained.

Software developers and vendors should be able to use the tests to check out their products before they are proposed to federal agencies. In any case, comments received may contribute to changes in the present test routines to make them more effective, he said.

If NBS implements the federal standard and puts the burden of testing proposed processors on individual government agencies, it will be a reversal of the way Cobol compiler acquisitions are handled under the Fips program.

Cobol was mandated as the language of choice by Fips Publication 21, but testing of proposed compilers was put in the hands of the Federal Cobol Compiler Testing Service. Results of validation runs made by the service are generally available through the National Technical Information Service in Springfield, Va.

The current NBS test programs are accompanied by four volumes of documentation titled *NBS Minimal Basic Test Programs — Version 1* and cataloged as NBS Internal Report 78-1420.

The first volume describes the test system and cross-indexes the test programs to the ANS Minimal Basic. The other three describe the specific tests that have developed to exercise various parts of the processor being evaluated.

Upon request, a single free copy of the programs and the documentation will be distributed to "federal agencies, Basic system developers and computer users concerned with acceptance testing," the NBS spokesman said.

The programs and documentation will be provided on two standard half-inch magnetic tapes. Requests, with two 2,400-foot 800 bit/in. tapes, should be sent to NBS, Institute for Computer Sciences and Technology, Computer Science Section — Technology A367, Washington, D.C. 20234.

Comments following review of the test programs should be sent to the same address by July 31, the spokesman said.

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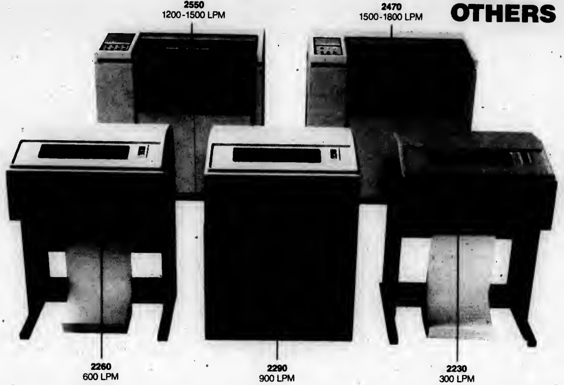

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Programmers Not So Menaced

Malpractice Seen Threat to Systems Designers

(Continued from Page 1)

Used chiefly by professionals to collect information, the computer today helps the lawyer with his legal research, the engineer with complex equations and simulations and the doctor with patient monitoring and diagnosis, DeRensis said. These professionals may run into liability troubles if they fail to use computer technology or if they rely on it too much, he warned.

A court would look at a number of factors in deciding whether a professional was liable for failing to use a computer — even when DP isn't used routinely for that application by his profession. Hardware and software availability for the application, the reliability of the system, its cost/benefit ratio and the extent to which it minimizes or reduces risks would be considered, DeRensis stated.

The Boston attorney said he does not believe the failure to use a system will automatically constitute malpractice should something go wrong. But, he added, as soon as computers become established for a particular application or in a specific profession, malpractice suits will plague those professionals who do not employ them.

At the same time, professionals must not depend on their computer systems too much. A professional is liable for malpractice if he relies on an erroneous output that is known or "should have been known" to contain a defect, DeRensis said.

DeRensis cited as an example a monitoring system in a Missouri hospital's intensive care unit. The system had a habit of registering the vital signs of one patient on the terminal monitoring another patient. Had a doctor relied on the system in an emergency situation, he would have courted a malpractice suit, the attorney said.

If the physician had no notice of the problem and used the system strictly as an aid, he would be liable only for his own errors in judgment. Unless the accepted practice of the hospital called for independent verification of the computer output and the doctor failed to obtain that assurance, he would have no liability for the computer malfunction.

The physician would have a duty to observe any system that is automatically activated, however. DeRensis told the CLA audience that an automatic blood transfusion system, for example, would dictate the use of parallel verification procedures in case an unknown system defect could cause the patient harm.

The professional who relies neither too much nor too little on a computer may find the system will reduce his malpractice exposure. Computers can perform some tasks better than humans, DeRensis reminded the association.

The supplier-manufacturer also will become a more vulnerable target for suit by injured clients, DeRensis said, because some of the loss suffered by professionals through malpractice suits can be shifted to the supplier-manufacturer.

Suppliers of equipment, software programs, data bases and services are all exposed to liability from a wide range of sources, including fraud, breaches of contract and harm done to the customers of a user — for instance, the patients of a doctor and the clients of an engineer.

Attorney and CLA Program Chairman Roy N. Freed, also with Powers & Hall, cautioned software firms against their insistence on calling programs "products" in an effort to endow them with substance. By maintaining that they sell products, these firms open themselves to product liability — not to mention taxes, he said.

Suppliers and users of computer systems alike should consciously limit their exposure to liability, Freed said. He urged the consideration of liability insurance, customer waivers of potential liability claims through contracts, efforts to reduce the risk of harm to others and lobbying for legislation to limit liability claims.

There are practical limitations to nearly all of these remedies, he acknowledged. Some types of insurance — particularly for creators of software programs and against fraud claims — aren't available at any price.

Insurance for service bureau errors and omissions is available, but only at inordinate prices, Freed said, and many customers won't agree to limiting liability through contracts.

Lobbying is expensive and consensus on the form and content of the legislation to be proposed is difficult, given the range of supplier and customer interests, he added.

Freed suggested that suppliers adopt pricing structures that provide for "self-insurance" in the event of a liability suit.

From the lawyer's viewpoint, computer system records can affect the legal liabilities of suppliers and users of DP and should be used in court cases, according to Martha M. Jenkins, an attorney with her own firm in Chicago.

Jenkins said lawyers must be aware of the new parties and liabilities that have come along with increased computer use. In general, she believes computers will enhance the trial lawyer's job by managing litigation.

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Ruling Due on Fairness of Burroughs Award

By Brad Schultz
CW Staff

BOSTON — A hearing into whether Burroughs Corp. fairly won a bid for the hardware needed to implement the Prosecutor's Management Information System (Promis) for the Massachusetts Supreme Judicial Court (SJC) has been concluded and the Hearing Officer will soon give her recommendation on the matter to the Massachusetts Committee on Criminal Justice (CCJ) Proposal Review Board.

Last December, runner-up Honeywell Information Systems, Inc. protested the SJC's handling of the bidding competition, prompting the hearing and causing CCJ general counsel John L. Tobin to charge the SJC Executive Office with failing to "engage in open and free competition in accordance with applicable minimum federal standards" [CW, March 6].

Tobin thereby stalled Massachusett's attempt to gain the first statewide implementation of Promis, a software package developed by the Institute for Law and Social Research (Inslaw) in Washington, D.C. To date, the system has run as a county court operation.

Promis is aimed at facilitating the prosecution of a high volume of cases, allowing more attention to be given "to those cases that deserve it," identifying defendants with multiple cases pending and providing "management reports helpful to those responsible for planning and evaluating court activities."

Tobin's committee is administering a Law Enforcement Assistance Administration (LEAA) grant enabling the court to acquire Promis. LEAA subsidized the creation of Promis and is making the system available to all public prosecution and court agencies — together with support, user group membership and Inslaw materials — at no charge.

Two Issues

The hearing addressed two issues: whether an SJC DP team fairly evaluated the bids and whether Burroughs' winning $815,000 bid was truly responsive to last year's request for proposal (RFP). Last November, the SJC evaluation team rejected HIS' $1.2 million proposal along with those of seven other vendors.

In the hearing, Tobin attempted to prove the SJC's DP center altered its system specifications in the "clarification" stage of the procurement process so HIS was misinformed about the requirements. HIS has claimed Burroughs' original bid was not responsive to the RFP, but was modified to be responsive only after the clarification.

In a "statement of facts" presented to Hearing Officer Barbara Clurman, both Tobin and Bigelow expressed their agreement with the following rendition of the procurement process:

- Bids were opened last August at a public meeting attended by all nine vendors responding to the RFP. A three-person evaluation team — including the SJC DP center director, Robert K. Mitchell — was established in September.
- Feeling it did not have sufficient information with which to make a selection, the team immediately asked SJC Executive Secretary John A. Fiske to request a clarification of response from all vendors. Fiske sent this request 10 days later, receiving answers from all but one vendor within about three weeks.
- The team heard oral presentations from six vendors in October and early November. After making site visits to the four vendors not excluded from consideration following these presentations, it narrowed the field to Burroughs and HIS.
- Soon afterwards, the team gave the nod to Burroughs because the firm "was responsive to the RFP as clarified . . . Burroughs was a responsible bidder, and . . . the Burroughs proposal was approximately $400,000 cheaper than the [HIS] . . . proposal of October . . . and $200,000 cheaper than [the HIS proposal] of November."
- In December, HIS branch manager John D. Borgman sent a formal letter of protest to Fiske, asserting that Fiske's office had held no public opening of the responses to the request for clarification; that Burroughs' response, based on its B1800 series hardware, did not "meet the mandatory specifications and requirements of the RFP in several respects"; and that the evaluation team improperly allowed modifications of some bids.

Decision Soon

Witnesses were examined and cross-examined during the two-day hearing, as Tobin and an HIS attorney took the offensive, while Bigelow represented the SJC and William McCormack of the Boston law firm of Bingham, Dan and Gould represented Burroughs.

Burroughs did not have representation on the first day of the hearing, but secured assistance from McCormack on the second day in response to the HIS use of counsel, a Burroughs spokesman indicated.

Clurman is expected to recommend to the CCJ Proposal Review Board on March 24 whether a reopening of the bidding is warranted.

A Burroughs spokesman has warned that, because other vendors learned the exact nature of the Burroughs proposal at the time the award was announced, these vendors could exploit this knowledge — representing two years of effort — should the bidding be reopened.

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Computer Expo Opens in Anaheim Tomorrow

ANAHEIM, Calif. — The Southern California Computer Expo '78 will open here. tomorrow for a three-day show at the Disneyland Hotel.

The show, the first stop of The Conference Co.'s nine-city Computer Caravan tour will feature a display of DP equipment from the nation's leading computer companies.

Exhibits will include computer systems, minicomputers, data entry systems, tape and disk drives, terminals, other peripheral equipment, software and services.

User Exchange

The Southern California Computer Expo has also scheduled three days of seminars and workshops for regional businessmen to provide them with a platform for an exchange of information on computer techniques and problems.

Based upon a growing interest in computer operation by chief executives across the nation, this year's seminar and workshop program will devote a full day to educating high-level business management on how to better use computers for corporate growth.

Other topics to be covered in depth include distributed processing and small business systems.

The complete three-day conference program, including workshops, exhibits, exhibitor seminars and the workshop notebook, costs $135.

Single days cost $55 each and entitle the participant to free entry to the exhibit area.

The exhibit floor is open to all users with a business card, according to conference coordinators.

Additional information is available from Kathy Quinn at The Conference Co., 60 Austin St., Newton, Mass. 02160.

Calendar

March 28-30, San Francisco — **Northwest Computer Expo '78**, sponsored by The Conference Co. Contact: Kathy Quinn, Computer Expo '78, 60 Austin St., Newton, Mass. 02160.

April 11-13, Houston — **Southwestern Computer Expo '78**, sponsored by The Conference Co. Contact: Kathy Quinn, Computer Expo '78, 60 Austin St., Newton, Mass. 02160.

April 12, Omaha, Neb. — **Sixth Annual Vendor's Exhibition of Computer & Business Communications Equipment and Supplies**, sponsored by the Ak-Sar-Ben Chapter of the Data Processing Management Association (DPMA). Contact: DPMA, 505 Busse Hgwy., Park Ridge, Ill. 60068.

April 18-20, Atlanta — **Southeastern Computer Expo '78**, sponsored by The Conference Co. Contact: Kathy Quinn, Computer Expo '78, 60 Austin St., Newton, Mass. 02160.

April 19-21, Newport Beach, Calif. — **Distributed Data Processing**, sponsored by the Institute for Science and Public Affairs. Contact: The Institute for Science and Public Affairs, Continuing Education Division, P.O. Box 31, Benjamin Franklin Station, Washington, D.C. 20044. Also being held at Boston, April 24-26, and Washington, D.C., April 25-27.

April 24-26, Anaheim, Calif. — **28th Annual Electronic Components Conference**, sponsored by Electronic Industries Association and the Institute of Electrical and Electronics Engineers. Contact: John P. Sheridan, 1978 Electronic Components Conference, c/o Sprague Electric Co., 2233 Wisconsin Ave. N.W., Washington, D.C. 20007.

April 24-26, New York — **Microprocessors — The Application Explosion**, sponsored by the American Institute of Industrial Engineers (AIIE). Contact: Dept. PR, AIIE Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

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The BTI 4000 has been proven in all kinds of applications—general accounting, dealer inventory control, entertainment ticketing, text publishing, school administration, and more.

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The BTI 4000 is a true timesharing system. It allows doing any mix of tasks, all at the same time, from any number of locations.

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With 100 Sessions Planned

NCC '78 to Stress Applications, Not Theory

MONTVALE, N.J. — The approximately 100 technical sessions of the 1978 National Computer Conference scheduled for June 5-8 in Anaheim, Calif., will stress practical applications rather than theoretical concepts of computer use, with special attention to the requirements of the end user.

According to Dr. Leonard Y. Liu, program co-chairman and director of systems architecture and standards for IBM in Poughkeepsie, N.Y., the sessions will cover the latest developments in 25 key topic areas relating to computer methodology, applications, systems and societal concerns.

Liu and program co-chairman Dr. Sakti P. Ghosh, a senior research staff member in the Computer Science Department of the IBM Research Laboratory in San Jose, Calif., plan for the conference to cover 10 applications areas. These will include such topics as special-purpose terminals, artificial intelligence, electronic funds transfer systems, simulation and personal computing.

The use of computers in helping to alleviate energy problems will be covered in six to eight sessions covering the use of decision support systems in planning for transportation; the application of large-scale models to predict future patterns in supply and demand for energy products; the use of microprocessor technology and microcomputers in conserving energy; and applications of computers in resource exploration. Four related sessions will center on image processing from remote sensing.

Methodology Area

According to Liu, the computer methodology track will cover performance measurement and evaluation, programming methodology, automatic programming and analyses of software techniques and tools.

In addition, a number of sessions will provide a detailed look at DP management and administration at the installation level.

The computer systems sector will cover data networks, distributed systems and programming and operating systems, with special attention given to computer architecture, the impact of recent developments on hardware technology and data base management systems.

Computer architecture will receive in-depth analysis, beginning with a review by leading industry experts of the evolution of minis, micros and mainframes. Other sessions will focus on standardization, the impact of the user on present-day architecture, development of large-scale computer architecture and a look at special-purpose machines developed for the military.

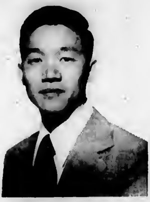
The "Impact of Recent Developments" will cover what's ahead in computer storage technology, peripheral devices and power supplies; very large system integration; advances in data communications; and business planning for the marketing of technology.

DBMS Coverage

Coverage of data base management systems will begin with an analysis of the decision to implement large-scale data base systems, followed by consideration of a number of factors including design, installation and personnel training.

The NCC '78 conference program will also explore the impact of computers on "People and Society" through 15 sessions covering communications regulatory policy, legislation and its impact and computer careers and education. Included will be a review of both existing legislation and proposals on the drawing boards, with emphasis on the projected impact on manufacturers, end users and society as a whole.

Specific topics include protection of proprietary interests in software, privacy, personnel issues, computer communications and computer crime.



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Records Transfer Net Helps Migrant Students

By Marguerite Zientara
CW Staff

LITTLE ROCK, Ark. — The constant mobility of migrant workers' children has been the major stumbling block in their education. The children, arriving at a school without records, are often placed in the wrong grades and cannot do the work assigned.

In order to keep track of each migrant student's educational and health histories and to make these records available to schools throughout the country, the computerized Migrant Student Record Transfer System (MSRTS) was established here eight years ago.

There are an estimated 500,000 migrant students in the U.S., who enroll in different school systems three to 15 times a year. By 1970 it was obvious to a group of state directors of migrant records transfer systems that something had to be done.

"We knew we had a problem in that we couldn't get the records to the school at the same time the child was there," MSRTS Director Joe Miller explained.

The MSRTS, which runs on an IBM 370/158 with 2M bytes of memory operated by the General Services Administration (GSA), contains "a wealth of information" in both academic and health areas, according to Miller. Specifically, the system contains test information, special interest information, special programs information, information on inoculations, academic screenings and any critical health problems that may exist.

The system, accessed by 160 terminals across the nation, originally contracted services through the University of Arkansas Medical Center starting in 1970. It leased an IBM 370/135 from 1973 until September of last year, when the GSA IBM 370/158 took over.

The system is in the process of being upgraded and soon an IBM 3705 controller will be used in place of the System/7 controller, Miller said. At present the computer is accessed by Teletype Corp. ASR 33 and ASR 35 terminals that are, according to Miller, "the cheapest mode of communications possible." A pilot is being run, however, and the terminals will be upgraded soon.

According to the Family Educational Rights Privacy Act, the MSRTS can release personal information only to the school in which a child is enrolled, Miller said. The system does, however, provide statistical data to states and the U.S. Office of Education.

Last year the program cost $3.23 per child for the year, regardless of the number of moves made or of the amount of information put into the computer, Miller said.

Game Lets Duffers Play Elite Courses

By Tim Scannell
CW Staff

NEW YORK — Teeing off at such notable golf courses as Pebble Beach, Firestone or Oahu is not an opportunity usually available to the occasional "duffer." The average player, restricted by a limited budget or lack of time, often pursues his sport at the local fairway or a nearby putting green.

However, by using a computer-simulated golf game manufactured here by Golf-O-Tron, Inc., a person can not only "play" at these prestigious courses, but also at Winged Foot, Pinehurst 2, Thunderbird and the Dunes as well.

Golf-O-Tron simulates play on a real golf course by means of hundreds of microcomputer-controlled slides that are projected onto a 10- by 10-foot nylon screen. A golfer, when playing one of the seven available courses, positions

(Continued on Page 16)

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Bank 'Secure' Even From System's Developers

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More and more companies are establishing comprehensive programs to protect their data centers and information from theft, alteration, disclosure and misuse. Some have developed in-house security systems and suddenly find that more than half their DP staff know how it worked, thus diluting the effective protection.

That's one reason a California bank decided to purchase a commercially available system that is transparent and confidential throughout the organization. The bank also found it could catch security violations even by people who had developed the product.

The bank had installed a system called Secure, developed by Boole & Babbage, to protect its data. Earlier this year, the bank also contracted Edward Syrett, manager of technical products for Tesseract Corp., to develop an accounts payable system. Syrett had worked with the Secure developers for more than a year and was fully familiar with the system.

One Friday evening, Syrett returned to the bank to get in some extra debugging time, but found that one of the utility programs for the on-line system wasn't working and needed to be relinked. However, the people who normally maintain the on-line system had already left.

Syrett was faced with two alternatives; either change around all of the JCL to use a different library or relink the utility, even though it wasn't his job, to get the debugging work done.

Deciding to relink, he tried to make the link in both TSO foreground and background, but kept receiving back a message that the job had failed with a 913 Abend code.

"I was new to TSO at the time," Syrett commented, "so when it failed the first time I figured that was just something else that didn't work. So I went to the reliable methods I was familiar with and submitted a background job and it also 913 abended.

"That's when it dawned on me that the utility was protected and that I had just perpetrated a security violation," Syrett added. "Most programmers or TSO users wouldn't have even known it was a security violation because the system is so transparent to the user."

He explained that if you look at the abend code in the IBM manual it will tell you that the operator didn't respond with the right code. However, Secure operates by assembling the password from information present in the job control or logon procedure and has taken the operator interface out of the picture by checking against itself passwords known only by the security officer.

"I realized I wasn't going to get any testing done, so I simply went home for the weekend," Syrett said. "In a sense it cost me some productive time from the bank's standpoint, it was worth it to them to lose time to protect their information."

Syrett noted that had the data not been protected, it would be possible for an individual to go in, make some changes and simply forget to tell the people responsible for maintaining the system which changes had been carried out.

"What I was trying to do was perfectly innocent and benign," he stated, "but there's no way the operating system could know that. Without any protection there would have been no record of my changes, and the next time someone used that module it might not work and the maintenance people would have had to spend hours digging into the program to locate the problem."

Simple to Solve

Syrett explained that if someone were to simply replace an entire module the problem would be simple to solve because operations could go back to their latest backup tape and reinstall the library.

"A couple of years ago, when I was with Stanford Linear Accelerator, it occurred to me that the most effective sabotage to an organization would be very subtle program changes," Syrett said. "If someone were to go in and make some changes in the Fortran subroutine library such as the one of the special function routines like sine or cosine, the calculations would be almost the same value but would be off 1% or 2%. That would mean that the scientific calculations would be processed but all of the numbers would be subtly wrong.

"Imagine how you could sabotage defense work or a project sensitive to a firm's ability to do business," Syrett speculated. "It would probably take years before anyone found out what was going on because the last thing you would suspect is that a canned, reliable routine would be providing wrong numbers."

Regarding his own run-in with Secure, Syrett said the following Monday morning the security officer approached him. She explained that she had been studying the Secure auditing report, which records all accesses and attempted accesses, and wanted to know why he had been attempting to access that particular data.

"My explanation must have been logical because I stayed on the project," he concluded.

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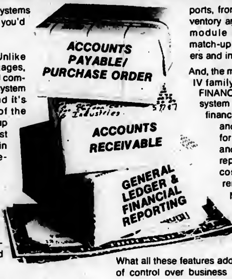
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Employee-Written Package Aids Highways

By Marguerite Zientara
CW Staff

WASHINGTON, D.C. — An employee in the Program Management Division of the Federal Highway Administration has written what he calls a "rather crude" program that enables his department to distribute valuable information to the state highway departments throughout the country.

The Program Management Information System's developer, who prefers not to be named, said the program was written "because the variations in the way states do things in this field are so great, and so unstable, there was no nice way of keeping this stuff current and answering questions, or giving specific examples on a national scale."

The program provides information selectable by key word, by major topic of information and by state. The major topics included in the program are:

- Laws of each state.
- Agency organizations of each state.
- Funding sources.
- The highway systems for which a state is responsible.
- "Need studies" indicating how much a highway system has deteriorated.
- What fiscal studies a state performs.
- How a highway program is developed.
- The procedures used for scheduling a highway project.
- Any unusual procedures in automation and computer use.

Requests for information might be made by a foreign country, trade association or a state, the developer said. The information would be especially helpful to any state highway agency manager seeking resource data applicable to his state's particular needs, he added.

The system, based on an IBM 360/65, produces a machine printout of the information sought and automatically prints out the name or number of a reference document or appropriate bibliography for further elaboration on a topic, according to the spokesman.

The system, started about two years ago, is just one program in the Department of Transportation's main computer system.

The program was originally developed as an attempt to visualize the progression from the passage of the laws that initiate highway projects through the actual projects themselves, the spokesman explained. This would include information on what studies the states do, how often they do them and whether they are required by law.

Duffers Play Elite Courses

(Continued from Page 14)

himself on a platform covered by artificial turf and drives a real ball at the screen.

The microprocessor measures the elapsed time between the ball leaving the tee and its impact on the screen's surface. As soon as the ball strikes the screen, another ball — this one made of light — appears at the point of impact and moves in an arc simulating the rest of the actual ball's flight.

Numbers indicating how far the shot has traveled and the yardage left to go are displayed in the upper right- and left-hand corners of the screen following each stroke. As each distance is registered, a different picture is flashed on the screen, depicting the view as it would appear if one were standing where the ball had landed.

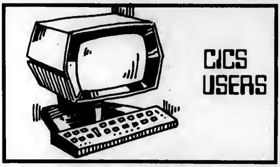
The ball's distance and trajectory are calculated to within one yard of the actual distance of the course represented on the screen, a Golf-O-Tron spokesman said.

Because of its realism, the game has been endorsed by the Professional Golfer's Association (PGA), although it is still "somewhat dubious about the yardage indications when using some of the higher number irons," Ken Davis, Golf-O-Tron president, said. "The repeatability of the yardage is there, however, and that's what it claims is very important."

Every 18-hole course is represented by 160 slides showing every possible angle on the fairway. The screen is sectioned into a grid containing 580 sensitive "spots" that register a position in the microcomputer if hit by a ball, Davis said.

Each unit has, in fact, more than 100 Texas Instrument, Inc. or National Semiconductor Corp. chips that are programmed for tracking distance and trajectory figures.

At $18,500 plus, the game "is not an inexpensive item," John Hallgart, production vice-president noted. "We're working on price breakdowns now and hope to get the unit's price down," he said.



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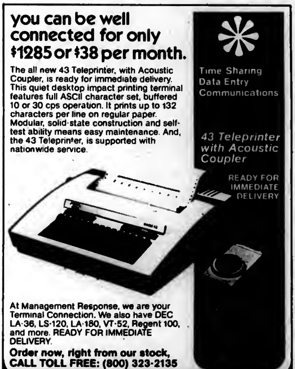
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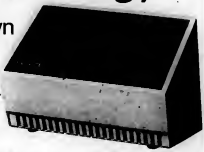

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Atomic Dimensions Possible

No Limits in Sight for Miniaturization: Keyes

By Frank Vaughan
CW Staff

SAN FRANCISCO — Progress in fabricating miniaturized components and in the art of lithography may well continue until the techniques "can cope with dimensions approaching atomic diameters," and there are no limits in sight,.according to Robert W. Keyes of IBM's Thomas J. Watson Research Center in Yorktown Heights, N.Y.

"Advances in electron and ion sources, particle optics, radiation-sensitive resists, etching processes and masking materials are the ingredients that will make further miniaturization possible,".he said at a recent conference here.

The crystalline imperfections that lead to the production of defective devices has limited the size of substrates. As these defects decrease, the size of future substrates will increase, he pointed out.

Better Circuit Designs

"A final trend that has contributed to the advance of integrated electronics is improvement in circuit design, so that fewer chips are needed to perform a given function," Keyes said. The chip area needed to implement a function has decreased even when the improvements in lithography are discounted, he noted.

"Advances in the technology of fabricating ever-smaller components on larger and larger substances can be expected far into the future," he said. "The basic questions to be investigated then are: 'What will the characteristics of ultraminiature devices be?' and 'What problems will be encountered in the utilization of chips containing thousands of high-performance circuits or millions of bits?' " he continued.

"The answer to the first question lies in the physics of electronic devices. The nonlinearity that enables 'on' and 'off' states to be clearly distinguished requires that applied voltages be large enought to dominate the random thermal motion of electrons. Applied voltages must also overcome the variability in thresholds and characteristics caused by lack of perfect manufacturing control of devices. The point is that voltages cannot be decreased infinitely as miniaturization advances; voltages of a substantial fraction of a volt will be required," he explained.

Another consequences of the application of voltage is the production of heat. While early circuits could easily be cooled by a flow of air, new cooling technologies involving, for example, the direct transfer of heat from solids to liquids, are emerging, he pointed out.

"The heat dissipation problem will become less severe when levels of integration reach the point at which systems contain only one or a few chips. The density of heat flow can then be reduced by conduction through a large solid heat sink and transferred to a fluid at low density," he suggested.

An additional limit is found in the problems of wiring semiconductor chips that contain large numbers of logic circuits, he said, noting that the sheer complexity of wiring design problems may prevent the optimum utilization of very large chips.

Report Alerts Users to 'Uncle Sam' Ploy

By Brad Schultz
CW Staff

WINTER PARK, Fla. — Computer vendors often use purported federal government commitments as an excuse to avoid handing out better deals to users, according to a recent report by International Computer Negotiations, Inc.

The report said vendor sales personnel tell users: "Look, we would really like to do that for you, but our [General Services Administration (GSA)] contracts . . . say we can't give — even a favored customer like your firm — a better deal than we give [the government]. So our hands are tied . . . we wouldn't want to break a contractural commitment to . . . our biggest customer."

Many users fall prey to this play because they don't understand what the vendor's GSA commitments really are; have a patriotic reticence about asking the vendor to break an agreement with Uncle Sam; are ignorant about how vendors can actually get around GSA commitments; and assume that asking for benefits beyond what the government got is unfair in some way, according to *CNReport* Volume 1, Issue 8.

Most vendors' commercial marketing people "do not even know what specific concessions their company has made" to the government, the report said, explaining that government contracting "is traditionally the responsibility of a separate vendor division, such as the 'federal systems division.' "

CNReport suggested four ways to counter these ploys: understand the vendor's position, be well apprised of the facts and use them shrewdly, listen carefully and shoot high in the negotiations.

To understand the vendor's position, the user should ask the vendor to supply a copy of the actual terms and conditions granted GSA, the report said.

As to obtaining and using the facts, the report recommended asking the sales representative if he is saying the firm cannot give a better deal than the one it gave the government or if it is offering the same deal.

If the vendor declines to make the same concessions the user can concentrate on why this is so; or if the vendor agrees to grant the same deal, the user will be well ahead, the report noted.

The report suggested making the transaction unique as a countermeasure to vendor insistence that a provision in its GSA contract forbids granting a better deal than the government received in a similar transaction. One way to do this is to type into the agreement a statement that the acquisition is experimental or the first of its type installed in a particular area, the report said.

Among other methods for evading the GSA ploy, the report recommended finding some "soft consideration" to compensate the vendor for a benefit the vendor claims cannot be provided free and asking the vendor to supply specified services or support with a guarantee that the work will be done within a certain time frame or at a maximum price.

Adapso Sets N.Y. Tax Meet

NEW YORK — A meeting will be held to discuss the recently announced New York State Tax Commission computer sales tax decisions on Wednesday, March 29, at 1:30 p.m. at the New York Hilton Hotel. The meeting, open to the public, is being sponsored by the Association of Data Processing Service Organizations (Adapso).

On Feb. 6, the New York State Department of Taxation and Finance, Taxpayer Services Division, issued a five-page technical service bulletin entitled "Computers," which sets forth the sales taxation decisions of the State Tax Commission on sales of computer programs, programming services, equipment and other DP services.

The bulletin defines taxable and nontaxable hardware, software and services and describes the procedure for obtaining a tax refund or credit.

It does not address the question of data conversion services (keypunching, tape updating, etc.), which will be the subject of the next release. The Department of Taxation and Finance invites comments from all interested persons regarding whether they believe such services should be subject to New York State or local sales taxes. Comments should be sent by April 1 to Commissioner Thomas Lynch, Department of Taxation and Finance, Building 9, State Campus, Albany, N.Y. 12227.

"Computers" is available from Frank Person Jr., Taxpayer Services Division, Department of Taxation and Finance, at the same address.

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Micro-Based Unit May Aid Arrhythmia Victims

MADISON, Wis. — The use of a microcomputer within a heart monitoring device the size of a paperback-dictionary may soon make possible instantaneous indications of arrhythmia for certain heart patients.

Work on the miniature system is being done at the University of Wisconsin-Madison's Biomedical Engineering Center by a team of two professors, two graduate students and a hospital programmer.

Prof. Willis J. Tompkins visualizes the monitor as running for up to a month at a time, measuring and recording an electrocardiogram (ECG) 200 times a second while the wearer goes about his daily business.

If and when it detected a peculiarity in the heart's electrical output, the monitor would first beep a warning to tell the patient there was something wrong and then display a message on a liquid crystal panel.

Finally, it would store in memory up to 16 seconds of the abnormal ECG along with its computer diagnosis of what was wrong.

The wearer could then go to a telephone, dial a regional heart center, couple the device to the phone and transmit the saved ECG for detailed analysis.

RAM and ROM Soon

In its present form, the device uses an RCA CDP 1802 microcomputer with 4K bytes of expandable memory, chosen because it uses almost no electrical current. The unit now uses random-access memory (RAM), but will eventually include both RAM and read-only memory (ROM), according to Tompkins.

Wires taped to the patient's chest carry the continuous heart signal to a section of the monitor that converts it to digital pulses. The pulses are stored in the memory and analyzed by the computer for heartbeat irregularities.

There are circuits to sound the beeper, power the liquid crystal display and convert the information for transmission by telephone lines. The information is transmitted via an inductive coupler at the rate of 300 bit/sec and in a working system would go to regional centers to be analyzed and forwarded to the patient's doctor, according to Tompkins.

The unit's memory records only about a quarter-minute's worth of data, and as long as the heart is behaving normally it simply records on top of the old information. Only when the heart misbehaves does the memory freeze-frame a permanent record for later transmittal.

While there are machines today which patients can wear to record heart activity, they use power-hungry tape recorders that limit battery life to about 24 hours, according to Tompkins. Without the "intelligence" of a computer to detect irregular heartbeats, tape machines must record the whole 24 hours, after which time a technician must search the entire tape for arrhythmias.

Parts cost for the unit is presently around $500, not including asembly labor costs, according to Tompkins. However, he said that ultimately this would probably be offered as a service, rather than retailed.

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ACM Now Seeking Nominations For Annual Grace Hopper Award

NEW YORK — The Association for Computing Machinery (ACM) here is seeking nominations for its Grace Murray Hopper Award, given each year to an outstanding young computer professional for a single recent major technical or service contribution to the computer community.

In order to qualify, candidates must have been 30 years of age or younger at the time the qualifying contribution was made, according to Richard G. Canning, chairman of the Hopper Award Committee.

The award will be presented at the opening session of ACM's annual conference next Dec. 4 in Washington, D.C. The award is in the amount of $1,000, donated by the Univac Divsion of Sperry Rand, and is accompanied by a certificate.

While the award is open to any professional in the computing community, emphasis for the 1978 award will be placed on contributions in the fields of business data processing and personal computing.

The nomination process is open to anyone, including those who may feel they themselves deserve the award, according to Canning, who publishes the "EDP Analyzer" newsletter.

In addition to showing the name, address and phone number of the nominee, each nomination should include a statement, from 200 to 500 words long, on why the candidate deserves the award.

A description of the contribution as well as comments on its value should be part of the statement, Canning noted.

The date of birth of the candidate and the date on which the qualifying work was completed as well as the name, address and phone number of the nominator should also be submitted, the chairman said, adding that all nominations should be in his hands by June 30.

Nominations should be sent to Canning at 925 Anza Ave., Vista, Calif. 92083.

Edutronics Course Helps Non-DPers

KANSAS CITY, Mo. — The Edutronics Group has released a multimedia in-house course entitled "Using the Computer as a Management Tool." The course was designed to show users the possibilities of DP and practical approaches to working with DP personnel.

The course consits of 12 modules and includes audiovisual presentations, case studies, a course book, leader's guides, conference leadership manuals and training charts.

Attention is focused on methods of identifying the difference between data and information, which a spokesman said Edutronics considers the key factor in understanding DP terminology.

Additional information on the other courses is available from the group's headquarters at 3435 Broadway, Kansas City, Mo. 64111 or other offices in Chicago, Boston, Dallas, Los Angeles, San Francisco, Washington, D.C. and New York.

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Insidious Threat Involved

Prepare for Nuclear Accidents, Users Advised

By Jeffry Beeler
CW Staff

N. BERGEN, N.J. — Only good fortune spared users from possible disaster following the recent crash of a nuclear-powered Soviet spy satellite in northern Canada.

If the malfunctioning Cosmos 954 had fallen near a large city instead of in a frozen wilderness, the resulting radiation could have severely disrupted DP operations miles from the crash site.

No such disruption occurred, of course, but the incident does dramatize the growing need for users to protect their systems from peacetime nuclear accidents, according to Bohdan Szuprowicz of 21st Century Research here.

In recent years, the threat of such accidents has steadily increased, and unless users institute adequate safeguards, their installations could someday fall victim to an atomic power plant malfunction, radioactive waste spill or some other equally unforeseen nuclear calamity, Szuprowicz warned.

Users also face a growing threat from less random nuclear disasters like terrorism and sabotage, he added.

Nuclear Power Plants

Before 1987, as many as 780 nuclear power plants will be in operation, under construction, on order or in planning stages in 55 countries. As these facilities send and receive nuclear fuels like plutonium across international borders and through unstable developing nations, the material could easily fall into the hands of terrorist or other insurgent groups bent on blackmailing or otherwise subverting established authorities, Szuprowicz predicted.

By the early 1990s, the traffic in fissionable materials will be equivalent to at least 6,000 nuclear bombs.

If a nuclear explosion from a terrorist or foreign attack did occur someday, the first and most devastating threat to computers (and everything else for that matter) would result of course from the initial blast effects — heat and firestorm, radiation and radioactive fallout. Fortunately, for users, the damage from these effects, though catastrophic, would probably be limited to a relatively small area, except during an extremely large blast or an all-out nuclear attack.

Insidious "Pulse"

A more insidious and wide-ranging threat would come later from a less familiar phenomenon called electromagnetic pulse (EMP), a form of destructive energy emitted during a nuclear explosion. After the immediate effects of an atomic blast had begun to subside, EMP could cause communications "blackouts" by disrupting the ionosphere, which reflects high-frequency transmissions back to earth, Szuprowicz warned.

The effects of this blackout could last hours and extend as far as 600 miles from the blast site, he added.

Users can protect their systems from the hazards of EMP in several ways, according to a spokesman from Norden Corp., a manufacturer of militarized computers. One precaution is to shield critical components and systems modules like power supplies in protective housings that could withstand the intense emissions from a nuclear explosion, the spokesman said.

Automatic Power Down

Another technique involves installing emissions detectors that would automatically cut power to computer systems when the intensity of nuclear emissions surpassed a set limit and then restore power when the level again fell below the danger point, he added.

These or other anti-EMP devices are a standard part of many military computers. But they are also "extremely complicated and expensive," the Norden spokesman noted, and thus might prove economically impractical for many nonmilitary users to implement.

As an additional safeguard against EMP, Szuprowicz suggested that users decrease their reliance on nuclearly vulnerable high-technology hardware. But he conceded that "such an approach would require that reversal of present trends in national policy and is thought unlikely to gain acceptance.".

Of course, some DP sites, because of their strategic importance, will remain almost impossible to defend against nuclear emergencies, no matter how carefully their users try to protect them, he added. Some of these particularly susceptible sites include electronics manufacturing plants, component assembly factories, oil refineries and petrochemical installations, electronic power generating stations, communications centers, air terminals, railroad marshalling yards, ports, dams and canals.

Another likely victim of a nuclear accident or attack would be the electronics industry, which depends heavily on coordinated inputs of a vast range of advanced technologies. In fact, almost every industry that relies heavily on computers and other electronic gear is more likely to feel the effects of a nuclear catastrophe than its less technologically advanced counterparts, Szuprowicz said.

Call for Papers

1978 BIENNIAL DISPLAY RESEARCH CONFERENCE, Cherry Hill, N.J., Oct 24-26, 1978

Previously unpublished papers on significant results in the field of electronic display materials, processes, devices, circuits and applications are requested. Areas of interest include light amifiers, direct view, addressing technology, projection and display characterization. Specific topics include phosphors, fiber and electron optics, cathodochromics, photochromics, concepts and new phenomena.

Send 20 copies of both a 35-word abstract and a one- or two-page draft summary by June 1 to Lawrence Goodman, RCA Laboratories, Princeton, N.J. 08540. Telephone is (609) 452-2700, ext. 2087. A few post-deadline papers on important new projects will be considered if 100-word abstracts and one- or two-page summaries are received by Sept. 18.

AMATEUR COMPUTING 78, Sheraton National Motor Hotel, Arlington, Va. July 22-23, 1978

Topics will include personal computing; amateur radio and microcomputers; home educational uses of computers; speech, music and graphics; standards for hardware, software and interfacing to the real world; and subjects of interest to beginners.

If interested in presenting a paper, participating in a panel discussion, displaying an amateur computer system or sponsoring a tutorial, submit a letter of intent along with a one-page abstract or outline by April 15 to John Wall Miller, program chairman, 6921 Pacific Lane, Annandale, Va. 22003. Telephone is (703) 256-5702.

SECOND INTERNATIONAL CONFERENCE ON COMPUTER SOFTWARE AND APPLICATIONS, Chicago, Ill., Nov. 13-15, 1978

The conference will bring together computer practitioners, users and researchers to share their ideas, experiences and requirements for applications software, management techniques and software development support, including automated techniques. Potential topics include software development methodology; reliability and maintainability; software tools; social, legal and regulatory issues, computerized decision-making systems; and application-oriented languages.

Send a 1,000- to 5,000-word paper by June 1 to Prof. C.V. Ramamoorthy, Dept. of Electrical Engineering & Computer Science, University of California, Berkeley, Calif. 94720.

THE SECOND ANNUAL SYMPOSIUM ON COMPUTER APPLICATIONS IN MEDICAL CARE, Washington, D.C. Nov. 5-8, 1978

The conference hopes to inform physicians and health care professionals about current and potential applications of computer technology to patient care and to identify areas of future research and development. Suggested topics include nuclear medicine, medical imaging, multiphasic testing, history-taking by computer, medical systems architecture and privacy and security of patient information.

Send three copies of an abstract outlining a 20-minute presentation by April 24 to F. Helmuth Orthner, Ph.D., Department of Clinical Engineering, School of Medicine and Health Sciences, 2300 K St. N.W., George Washington University, Washington, D.C. 20037.

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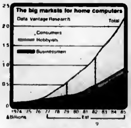

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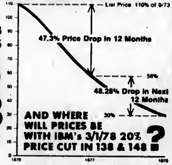

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DP Control Project Gets Print Into Braille Faster

By Marguerite Zientara
CW Staff

SYRACUSE, N.Y. — The computer can now help the blind to read and may soon help some people with lesser visual problems to see, thanks to work done by Syracuse University's John Biegel, professor of industrial engineering and operations research.

Biegel, while guiding students in design projects, has developed a system for translating information into braille for the blind and is experimenting with a computerized contact lens-grinding system.

"The problem in braille is one of physical size," Biegel noted. "Each braille character takes up six times the space of an English letter. Typing manually with a standard braille typing machine, it takes two hands to type a single character. It is a very slow process, it takes up a lot of space and it's very slow to read," he said.

In Biegel's system, a Teletype Corp. ASR 33 allows input to a Digital Equipment Corp. PDP-8 minicomputer with an editor in the memory. The English text is edited as it's being input and the computer outputs a paper tape coded for use with a PDP-14, a machine controller. The controller is connected to a manual braille writer that has been modified so the keys are operated with solenoids.

Writing Time Cut

The computerized system reduces the braille writing time by a factor of three or four, Biegel estimated. Although he believes other similar systems exist, he thinks his may be unique in its use of the editor as an in-between process.

"If you make an error in braille, usually you have to start a page over," Biegel said. "You can't erase. With the editor, however, all the corrections are made before the typing begins."

Biegel's work so far has been in Grade 1 braille — a one-for-one translation from the English text. Grade 2 braille, which has a lot of contractions and cuts down the total amount of writing to 50% to 60%, is now occupying one of Biegel's students' time.

"For this project we have to put together a dictionary. When a word is input into the computer, it will have to check with the dictionary to see if it can be contracted," he said.

"The problem is that there isn't much being done in braille," Biegel explained. "If you can even get a braille text, chances are it will be six to eight years old."

"Blind people generally do not have the funds necessary to realize this sort of project," Biegel noted. He said he hasn't received any funds to support his work, which took about a year to complete, but that they may be available thorugh charitable organizations.

With variations on his system, Biegel thinks, the same thing could be done less expensively.

Lens Grinding Project

A second project on which Biegel has been gradually working for the last four ears is that of computer-controlled contact lens grinding. "The reason a lot of people don't wear contact lenses is that with the present manner of making them, they will fit only near-sighted and far-sighted people," Biegel said.

"People with astigmatism, for example, cannot wear them. The computerized process would enable such people to wear contacts," he said.

Biegel uses the same principle of computer control in this process, except that the computer is an MMD 1 microcomputer from E&L Instruments of Derby, Conn. The micro controls a lathe.

To measure the eye, one takes a negative of the eye using a focal plane arrangement. The distance between a pair of concentric rings will give the distance of the eye below the focal plane at that point, according to Biegel.

That information is read into the computer, which then translates it into input for the lathe to grind the exact contour of the eye on the inside of the lens. In order to make lenses for people with astigmatism, for example, the inside of the lens must fit the contour of the eye.

At the present time, Biegel has not been able to produce any lenses which are optically correct. "The problem is getting a very fine surface finish that doesn't require additional polishing. When you polish the lens, you polish off the contours you put in it," he said.

Biegel is hopeful for the success of the process: "It's just a matter of time."

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Urges Unified Approach

Eger Warns Privacy Laws Blocking Data Flow

By Ronald A. Frank
CW Staff

LAS VEGAS — Laws being enacted in various countries to ensure the privacy of data are blocking the free flow of information throughout the world, according to John M. Eger, attorney and consultant.

Unless some unified approach is taken to the transborder data problem, each country will enact its own set of restrictions. Taken together, these laws will form an "information curtain," rigidly blocking the transnational flow of information throughout the world, Eger said at the recent Interface 78 conference here.

Nineteen countries now have data protection laws on the books or in the making, he noted; others have laws in force or under consideration to protect sovereignty, sensitive data and privacy.

The net effect that many countries see from the free exchange of information is electronic colonization or electronic imperialism. This viewpoint is prevalent in the Third World countries, which see information endangering traditional national roles, Eger indicated.

The industrial nations see these laws as a form of protectionism to prevent U.S. dominance, he said.

Canadian Control

Agreeing that the trend is toward control, Frank Main, a member of the Canadian Parliament and secretary to the minister of state for science and technology, said the Canadian government probably will have to regulate some aspects of transborder data flow because "there are too many forces at play to allow ourselves the luxury of zero regulation."

While Main could not predict exactly what laws will be proposed, he said they would be designed to protect the interests of Canadians while at the same time being compatible with the interests of other nations.

By 1985, Canadian users will be importing $1.5 billion worth of data processing services each year; as much as 80% of this total will be the result of parent-to-subsidiary transactions across the U.S.-Canadian border, Main predicted.

One of the key questions being studied in Canada, according to Main, is whether it is necessary to require laws that make it mandatory for the records of Canadian companies to be kept in Canada. An alternative might be a series of international data extradition treaties.

If Canada establishes a need to require domestic storage of corporate data, then there is a question of whether it would be possible to resist pressures for similar action with respect to personal data, Main said.

European Controls

Louis Pouzin, director of communications projects at Iria, the French research institute, said European controls against an influx of U.S. data will be implemented by the national postal, telephone and telegraph (PTT) authorities implementing high international tariffs. These tariffs will inhibit the expansion of U.S. networks into Europe and encourage the installation of DP centers in Europe.

The PTTs understand DP and communications cannot be sold separately and are therefore considering ways to set up national DP service bureaus. These may well be expanded into national networks, Pouzin believes.

American firms will be in a better position to expand their international networks if they create national subsidiaries jointly with European firms, he said.

Tariff barriers will prove to be more effective to prevent data exchange than laws which seek to control it, he said.

Hansen to Start Salary Survey

LAKE BLUFF, Ill. — Survey questionnaires for A.S. Hansen, Inc.'s 1978 Weber Salary Survey will be ready for distribution soon. The survey, which will be published in mid-August for the 14th consecutive year, contains salaries of DP employees ranging from the data entry clerk to the DP manager. Salaries are reported by city, industry and size of DP installation.

Companies that participate in the survey may purchase a copy of the report for $65. The price to nonparticipants is $125.

For additional information, survey forms and details about the industry codes, size ranges and precise skill levels covered by the survey, contact Sandra L. Green at A.S. Hansen, Inc., 1080 Green Bay Road, Lake Bluff, Ill. 60044.

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Editorial

New Tack for IBM?

The possibility of IBM entering the retail electronics marketplace — and more particularly the computer store arena [CW, March 13] — raises some interesting points.

The early days of computer stores — just a few years ago — saw these enterprises spring up largely to serve the computer hobbyist, much like early radio stores catered to the amateur radio fan.

However, the computer store market has been changing quickly.

Portia Isaacson, founder of the Micro Store and one of the most ardent advocates of personal computing, noted recently that the store that caters to small business and industrial applications has the greatest potential for growth [CW, Feb. 27].

It is apparently this tack that IBM will pursue with its expanded concept of demonstration centers for its line of small business computers systems, presently limited to the 5100 series, but sure to grow.

More and more computer stores promise to become "small systems house(s) in disguise as retail outlet(s)" — to quote Isaacson once again. And it appears the giant of the medium and large computer market is poised to react quickly to this growing phenomenon. With $4 billion in cash and marketable securities in the vaults, IBM could certainly be a formidable competitor.

The Lengthening Shadow

What Users Are Betting On

The recent Interface 78 show in Las Vegas reminded industry veterans of the old Fall Joint Computer Conferences held in the same city.

Most vendors introduced something new and there was talk of an even larger show next year. Some sessions were held in rooms that handled about 200 persons, and attendees spilled into the halls.

The upbeat mood of the conference was evidence of the increased importance being attached to communications by the average company.

Archie McGill of AT&T predicted that in the 1980s, corporate telecommunications will be restructured along applications lines integrating the various disciplines such as voice and data that are now separate within different management staffs. Few disagreed.

Many users at the show said they were on the threshold of configuring networks with expanded facilities and more sophisticated equipment. The constantly changing technology and service offerings in the communications area made it mandatory for them to keep abreast of latest developments by attending shows like Interface, these users said.

There were those who had predicted that Las Vegas would not be the best place to hold a show. But attendees trying to fight their way into overcrowded sessions had a hard time believing that fellow managers were in the hotel casinos instead of at technical sessions.

Distributed DP, telecommunications and other related disciplines are merging more rapidly than anyone realizes and users are eager to learn about the alternatives.

Data Past

Five Years Ago
March 21, 1973

WHITE PLAINS, N.Y. — IBM unveiled the long-expected 370/115 as an entry-level machine — to the virtual memory 370 series — for users of IBM System/3s and smaller 360 models.

— — —

WASHINGTON, D.C. — The General Accounting Office (GAO) said in a report that Congress should not appropriate further funds for the FBI's Computerized Criminal History system until "the FBI and Law Enforcement Assistance Administration implement a program for improving the reporting of arrests and dispositions by law enforcement agencies, courts and correctional institutions."

Eight Years Ago
March 25, 1970

NEW YORK — RCA Corp. announced the first full commercial lease/purchase program for computer systems. Under the plan, a user who signed a special six-year contract would receive a 15% reduction from the normal lease rates and own the computer at the end of six years.

— — —

LOS ANGELES — The economic situation had grown so serious here that programmers "walked the streets," according to statements from employment agencies. DP managers reported trying to hold on to their best programmers in hopes that things would improve, but many had their doubts.

Letters to the Editor

How About Others' Rights?

John M. Eger's comments regarding the national interests of the U.S. are equally applicable to the national interests of other countries such as Canada ["Transnational Data Flow: The Need for Action," CW, Feb. 13].

With all the adverse publicity over the past few years, does any reader of *Computerworld* believe in the accuracy of information in criminal record files or credit agency files? Politicians in the U.S. have demonstrated they are quite willing to subpoena and disclose information from private corporations and government agencies. Is there any attempt to verify the accuracy of information about citizens of other countries?

There are many publicized cases in Canada in which the U.S. State Department has tried to "influence" (or force) Canadian politicians into adopting aspects of U.S. foreign policy that were contrary to Canadian interests — for instance, trade with China. The efforts made have been more successful if they had easy access to personal, credit and "sensitive" information on Canadians.

Computers are used extensively for processing seismic exploratory data in the oil industry. In Calgary, the location of the head offices of most oil companies operating in Canada, per capita spending on DP is one of the highest in the world. The subsidiaries of two U.S.-controlled oil companies had justified the installation of expanded computer centers for seismic processing. On orders from the "U.S. head offices," the plans were abandoned and seismic processing was performed in the U.S.

The data transmission costs alone were more than the costs of the planned increased computer facilities for Calgary.

Recently one of these companies announced a major new Canadian discovery. How long has it had the data in Houston?

For at least these companies, more is known in the U.S. about potential Canadian oil and gas reservoirs than is known in Canada. This situation only aids the socialists that demand that Canada nationalize the "foreign"-controlled oil industry.

Canadians are just as concerned as Americans about rights, privacy, profits and jobs. We do not share Eger's views that these should be exported to the U.S. Canadians are not interested in supporting any policies that would "cripple our economy" and that would cause a "severe recession with massive unemployment."

I hope most of your readers do not share Eger's opinions.

Kenneth D. Jones
Calgary, Alberta

Constructive Criticism

I wish to thank you for all the positive action "Late Software Delivery Hurts B80 User" [CW, Feb. 27] has generated. I first heard of the article directly from Burroughs Corp. and it seems to have hit a "sore" spot, which I hope will benefit other B80 users in distress.

I have also received several calls from other B80 users in various states and they are equally disappointed in Burroughs' software schedule. Certainly, Burroughs should view this as "constructive criticism" from the many loyal B80 users like myself.

Thanks again for a job well done.

Hector Villarreal
Comptroller
M.W. Fruit Co.
Pharr, Texas

(Other letters on Page 24.)

And Hold the Jargon

When You Brief Your Boss, Do It Briefly

The Human Connection

By Jack Stone
Special to CW

Certainly one of the most frustrating aspects of the typical DP manager's job is handling "bad press." I am, of course, referring to the difficulties the manager has in overcoming what seems to be unending communications problems between DP and the rest of the organization — the internal "public" relations as it were.

In the March 6 column, I talked about excessive use of jargon by DPers as a most successful tool for losing friends and alienating people. This week, I'd like to discuss my approach to a particular but very significant problem that DP managers and analysts have in relating to the top (non-DP) executive.

The situation came to mind some months back when I received a call from an analyst friend of mine. He said he was in the process of making an executive presentation regarding a system study and asked if I might review the briefing materials.

The purpose of the presentation was to deliver the results of the study of an existing system and to recommend improvements. His documentation was nothing short of brilliant. All of the data flows were diagrammed in excruciating detail. The procedures and processes were carefully narrated — page after page.

There was but a single, alas tragic, flaw to it all. Except for the statement of objective, it was, in my judgment, completely incomprehensible to an executive. With respect to meeting the primary objective of the presentation — namely, getting a go-ahead to implement system changes — the documentation was a disaster.

Presenting Study Results

Let me relate here what I told him, my personal approach to packaging study results for executive decision-making. As you read, you may object to my insistence on stringent length restrictions, claiming they are too arbitrary and superficial. But my experience in training and dealing with top executives tells me that when it comes to managing the DP function, an executive's interest wanes at roughly the fourth power of the time he has to spend on the subject. In other words, brevity is the keynote!

- First, the structure of the first section — "Summary." We begin with a problem statement," — three sentences at most. The current system is not meeting processing requirements in some ways or other, for some reasons or other. Don't use numbers here, just general terms expressed in proper English.

Then write a "statement of objective(s)" for the study that resulted in this document — the extent of the plan and the main deficiencies. Three sentences here.

Next should come a capsule of the "study results," a non-numeric general rendition of the findings — another three sentences.

Finally, the "payoff." This is one sentence long and states what is expected of the new system, in terms of simple numbers, as related to *vital* business issues.

If you are concerned that you are sticking your neck out too far on the payoff matter, then add a "caveat" clause. For example, "Assuming that no new major systems development projects are started in the next three months, it is expected with this system that base profitability to the corporation should be increased by X% during the fiscal year beginning in July."

- The second section, "Introduction," is an expansion of the material contained in the first section, but is structured to provide a somewhat different perspective for the reader. For example, the subsections could be labeled "background," "scope," "recommendations," and "projected benefits." The additional detail would allow for some quantitative information, but no charts, or graphs.

And above all, don't put in a detailed discussion of *how* system improvements would be implemented. Keep it all on the functional capabilities level. Limit the writing to three single-spaced typewritten pages.

- The third section, "Current System," has two parts: "system description" and "major deficiencies." The description consists of exactly two pages, one for narrative data flow and one for an illustrative diagram of the flow.

Do not use the conventional flowchart symbols in the diagram. Instead, use figures representative of the physical boxes familiar to the executive. And don't connect the boxes with straight lines; get someone on the staff with an artistic bent to draw some interesting arrows or lightening bolts. It really makes a different with this audience.

The "major deficiencies" part should describe the key inadequacies of the current system. Limit this to one page.

- The fourth section, "Future System," has "system description" and "major advantages" subsections that parallel the previous section. The "advantages" narrative should be a point-by-point answer to the deficiencies of the current system.

Finally, package all the technical detail in an awesome black binder, bring it to the meeting, point to it once or twice during the session, but never, never show it to the executive — he'll develop a glassy-eyed stare.

Letters to Stone should be addressed to him at Suite 222, 2233 Wisconsin Ave. N.W., Washington, D.C. 20007.

In Federal 'Upgrade' Project

Prompting Works With Sifted Data Bases

The Taylor Report

By
Alan
Taylor
CDP

Acronyms are often misleading — but the acronym Upgrade, for User-Prompted Graphic Data Evaluation, is not only accurate, it actually understates the real importance of the technical methodology being used by the President's Council On Environmental Quality (CEQ).

The problem CEQ was trying to attack when it started the Upgrade project some four years ago was that while there was a lot of data around in different data bases — such as those in the Geological Survey, National Institutes of Health and the Environmental Protection Agency — the contents of each of the data bases were structured differently, and more important, had different meanings because of the different collection and validation methods used.

Yet, the data from one base was often needed to make comparisons with data from the bases of other disciplines — for instance, studying the affect of clean air on the incidence of illnesses.

The approach taken was to set up a screened data base, containing data from the various bases that was compatible insofar as it was usable for various statistical examinations. The yield of compatible data may be considered shockingly low — it was around 5% — but I don't think this is surprising at the current state of the art.

Prompted Input

The input methods of Upgrade were a major source of concern and special treatment. It was appreciated that users would be primarily concerned with tracing and solving special problems, such as the causes for the high incidence of cancer in New Jersey. They would not have prior knowledge of computers or of Upgrade.

So in effect, they had to be trained on the job. The method selected for providing this training was to let the user prompt the action, working from menus of available actions, with "help" functions available to explain the various facilities and how to call them in.

Upgrade even confirms the user's instructions before acting on them.

Output is also under user control, again using menu selection techniques. Various graphics are emphasized on the menus to help users focus on the relationships being displayed.

One of the best features is the multiple processing capability. There are some regression and other facilities built in, but the system also performs interfacing work that can make facilities on other computers or other computer networks (such as Telenet) available.

Currently, there are no interfaces to Arpanet, which seems curious in the light of the obvious advantage and availability of such an interface, but the system design — which is the interesting thing from the professional point of view — allows for them.

Operational Results

The Upgrade system has already shown itself to be semitransportable. New Jersey is using a terminal system to trace the cancer situation, concentrating on the industrial use of various chemicals. In New Jersey there were 14,000 cancer deaths in 1976 — and a new law. The Cancer Registry Law in combination with the 1977 Toxic Substance Control Act are producing astonishing data about substances state officials had previously considered innocuous.

The data is being plugged in and used in conjunction with the CEQ data bank and Upgrade facilities. While nothing has been definitely confirmed, the state people are very excited about progress.

Cost may well be one of the items that is most exciting. For the evening discount cost of $8.80 on CEQ's IBM 370/168, using a 500K region, I took a look at various basic data for the counties of Massachusetts. I did a few analyses, came up with some surprising figures and documented a possible line of investigation with graphs and statistical work. This took about an hour, starting from scratch (and Upgrade). That is certainly going to be worthwhile.

System Development

Development of the system for the CEQ has been in the hands of Sigma Data Computing Corp. of Rockville, Md., and the system is being written so as to be transportable both to other hardware and to other application areas. The costs have not been excessive and everything seems to have been done with state-of-the-art hardware and software. I think this approach of a screened data base, with user-centered input and output and interfacing processing capabilities is the most effective use of money for any data base system I have seen.

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Letters to the Editor

What Would Grosch Say About Third Survivor?

One of the most enjoyable features of *Computerworld* used to be the outrageous predictions by Herb Grosch on the future of the computer industry. There were many amusing variations of his analogy comparing IBM and its competitors to Snow White and the Seven Dwarfs. But futurology in those days seems simple by comparison with would-be predictions made today.

One, having some credibility, was recounted recently in a *UK Financial Times* survey of the computer industry; it is simply that by the mid-1980s, only three corporations will survive; IBM, a Japanese combine and one other. The interest is in predicting the one other.

On the basis that by the mid-80s information processing will be an amalgam of DP and communications, it would be a brave futurologist indeed who will forecast which consortium of mainframe vendors, mini and micro vendors and even communications companies will make the running. Do you think we could put the question to Herb Grosch?

H.P. Thornhill

London, England

Annoyed at Starkman

A response to Barry Starkman |"Any Advice for DP Grad?" CW, Feb. 13|:

I am annoyed that you have found that there are no entry-level jobs in data processing. For the last six years at the University of Wisconsin-Platteville, we have placed 100% of our computer science students who seek programming positions. The answers to your questions, based on our graduates are:

1. Beginners are not more likely to find jobs than experienced programmers.
2. No particular area would be best, but you should plan on relocating.
3. A quality university will usually find its graduates are in demand.
4. While it is interesting to consider how most programmers get their first jobs, perhaps you should review your experiences and abilities.
5. Look hard.
6. The total academic history is usually of most importance.
7. Computer science programs may range in the preparation they provide for DP positions from excellent down to almost worthless.
8. A B.S. in computer science from a university with an established record for producing good entry-level programmers will normally produce the widest employment opportunities. Play it safe.
9. If nothing else works, try writing an article about your problem in *Computerworld*, but don't mention your university.

Dr. Leonard Myers, Chairman
Computer Science Department
University of Wisconsin
Platteville, Wis.

Ignored Honest Firms

It is imperative that I respond to Alan Taylor's column of Feb. 27 |"Readers Document DP-Controlled Rip-Offs"|. Taylor made general, sweeping accusations about the search and placement business. Although he did make some valid comments, he chose to ignore those search and placement firms that maintain the highest standards of integrity and confidentiality. Readers have probably encountered experiences with both types of firms.

At last count, there were appruximately 600 "management consultant search and placement" firms in Massachusetts. These firms run the gamut: there are the search divisions of the big eight accounting firms, and then there are individuals operating from corner telephone booths. Yet, it is the individual applicant who selects which consulting firm will present him to the computer world.

Quite honestly, I am amazed at the casual attitude applicants take during this critical decision-making process.

We all realize that the computer industry is currently the most rapidly growing segment of the New England community. The lack of qualified personnel to satisfy growing needs has created an atmosphere ripe for the opportunist.

If an individual were going to seek legal or tax counsel, he would be very demanding of the professional in whom he was placing his confidence. Why then should one be less demanding of the professional who is planning his career pattern?

I sincerely hope Taylor will explore and consider the firms of which I speak.

Joe Vito
President

Multi Processing, Inc.
Lexington, Mass.

Like a Ticking Bomb

The federal court decision reported in the short article "Banks Barred From Providing DP Services" |CW, Jan. 30| seems like a ticking bomb about to explode. The legal precedent could generate the subsequent divestiture of financial institutions' DP services as a form of "unfair competition" with independent computer service bureaus.

The subject presents some interesting possibilities.

James S. Moyer

Westminster, Calif.

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Vendors Plan to Support Users

One Universal DBMS Standard Not Probable

By Eugene I. Lowenthal
Special to CW

L.E. Towner's view of data base management system [DBMS] standardization was naive ["Non-Codasyl DBMS a Bad Choice for Users," CW, Feb. 6]. He asserted that, given a Codasyl standard, "the non-Codasyl DBMS vendor will be forced to upgrade his sytem" and that if the user "thinks the vendor will continue to enhance and maintain what it considers an obsolete version, he had better think again."

These statements were presumptuous, have no basis in experience and totally ignored the realities of business relationships between suppliers and their customers. Consider the number of programs that have been written using current data manipulation languages, the number of data bases that have been created, the number of programmers and end users who have been trained to use the packages that have been around for five or more years.

The cost of conversion to a new DBMS would clearly be enormous. It has been MRI Systems Corp.'s long-standing policy to protect that investment by perpetuating the various languages and by providing "bridges" between system upgrades. The company is engaged in intensive future product planning.

We have also considered several strategies with respect to the potential of standardization. In every case the plan calls for continued long-term support of the languages on which our customers have come to depend.

If MRI were motivated to develop and market a Codasyl-compatible DBMS, this would not be inconsistent with a policy of enhancing and maintaining our current product. Indeed, if it came down to that, it would not be technically difficult to produce a DBMS that supports both styles of user interface.

Although I cannot speak for other vendors, it appears likely they would have a similar outlook. None of us is interested in incurring the wrath of the installed customer base.

Multiple Standards Likely

The Codasyl Data Base Task Group delivered its report in April 1971. In the seven years that have since passed, the proposal has not achieved the status of a standard — despite the number of Codasyl-oriented commercial packages and despite the regularly published predictions that adoption of a Codasyl standard is inevitable.

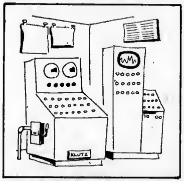
Reader Commentary

Some fault the industry, particularly IBM, for not blessing the concept and actively resisting standardization efforts. Others point to the user's increasing demand for high-level languages and data independence, coupled with the availability of competing data base approaches that address these needs far better than the proposed Codasyl "navigational" data manipulation language does.

A likely outcome is the evolution of multiple standards, in recognition of different styles of interface that are appropriate for different uses, just as there continues to be a niche for Fortran as well as Cobol.

What is not probable is the widespread adoption of a single, universal standard as envisioned by Towner.

Lowenthol is vice-president of odvonced product development ot MRI Systems Corp. in Austin, Texos.



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Datapro Liberating DP From Sturgis' Curse

By Joseph T. Rigo
Special to CW

Reader Commentary

I love Datapro.

I think its ratings of hardware and software products are just great.

Our company writes user manuals for some of the software vandors whose products are rated in Datapro Research Corp.'s surveys. I lova the ratings because they are liberating our business from the curse of Miss Sturgis.

Miss Sturgis was my high school English teacher in Portland, Maine. She was a graat person and an extremely affective teacher. She would scream bloody murder, climb onto her desk, make any sort of fool of herself to put an idea across.

My complaint is that she thought English was a natural science. She believed there were laws to be followed, not just conventions.

Miss Sturgis beliaved people who obeyed the laws would laad long, cultured lives. Those who failad to obey were condemned to spend their days scratching their armpits in public.

She did not preach what she practiced.

To Miss Sturgis, any instructional techniqua, within the laws of morality, was valid if it helped to force a concept into a student's head. Writing, however, had to follow all the established rules of formal literature.

She would have no use for a first-class user manual for system software. A good manual contains too many one-sentenca paragraphs. It uses technical jargon and employs strange page formats. The writer may appear to know more about computer programming than about Hemingway. The manual does not look like a work of literary art.

For years, howevar, Miss Sturgis' laws have prevailed in large parts of our industry. Technical writers have been expected to turn out work that was grammatically perfect. All alsa was sacondary.

The manual had to look good. If it didn't work as a reference aid, tha customer could phone a programmer for help.

Now hera is Datapro asking computer users to rate the products they buy. Ratings are for ovarall satisfaction, performance, ease of use, ease of installation, vendor technical support, training and, lo and behold, for quality of documentation.

For tha first time, there is an independent tool to evaluate tha effectivaness of a writer's work. It is not enough for the manual to be grammatically correct. It must also tell the user how to do a job.

Already Getting Results

The Datapro system is new. It is still being debugged, but it is already influential.

Survey results are beginning to get respect where it counts — in the markatplace. As vendors of documentation, we have found that high Datapro ratings give us a very real competitive edge.

The good thing about the ratings is that they will act to improve documentation across the board. Surely, no one will complain about that.

IBM, for example, typically spends $60,000 to write a customer programmer's guide and get it ready for the printer. An independent software vendor may spend $20,000 to document a comparable product.

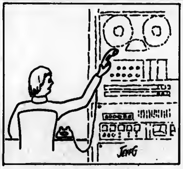
IBM executives don't like it when Datapro scores their product at 2.5 (out of a possible 4.0) and the independent vendor gets 3.5 for one-third the price. IBM executives don't mind the cost so much, but they are a competitive bunch. We can be sure they will be working to get their scores up, and other vendors will be pushing to keep pace or do better.

At the moment, Datapro is still in the development stage. Many of its ratings are based on a ludicrously small number of responses. Also, I think, non-IBM users tend to be disproportionately compassionate toward their vendors for various reasons.

Still, the system gets better every year. Datapro is clearly doing its best to improve its product.

In the meantime, it is good to know that someone besides Miss Sturgis is keeping score in the documentation field. She never did like my sentence structure.

Rigo is president of Sysdoc, Inc. in New York.



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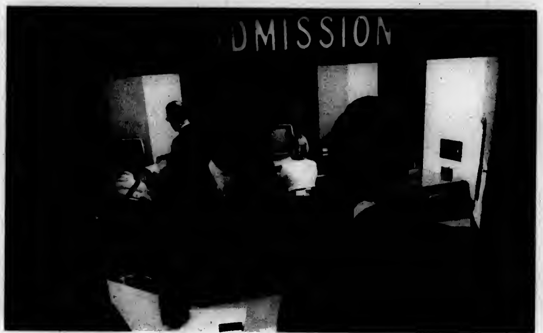
DP Dialogue

Notes and observations from IBM
that may prove of interest to
data processing professionals

Thomas Jefferson University Hospital Shapes Applications with DMS/VS



Personnel in the admissions office at Thomas Jefferson University Hospital use an online information system. IBM's DMS/VS decreases the development cycle and lets users participate in the design.

At Thomas Jefferson University Hospital, Philadelphia, the admissions office reserves and assigns beds, maintains its census of patients and keeps the demographic part of the medical record up-to-date using Display Management System/Virtual Storage (DMS/VS).

An IBM program product, DMS/VS converts information from a fill-in-the-blanks form directly into executable programs. It generates and displays user-defined screen formats, processes terminal transactions, and accesses an existing data base, or one newly defined under DMS/VS. Screen formats can be revised and new ones added quickly and easily, without reprogramming, by making entries on a preprinted form.

"DMS serves both as a powerful programming aid and as a medium for the exchange of ideas and information between the admissions office people and those of us in systems," says Dick Hornickle, project manager. "It enables us to allow the user to work directly with us in designing the screens to meet their needs precisely."

"The number of display formats in the system is constantly growing," says Waldren Bailey, director of admissions. "DMS aids in transforming our screen formats and transactions concepts directly into online routines. We have eliminated considerable data redundancy, our records are more accurate and complete, and we are achieving much better scheduling and operational control. Patient data, bed assignments and bed availability information are easily accessible."

Patient Management Support

"Our management plans call for extensive use of data base and data communications in our System/370, and admissions was the logical place to begin — where information on patients is initially collected," says Byron Irwin, associate director. "The medical and patient-oriented approach to the design of our systems demands heavy user participation in the design and a high degree of productivity in its development.

"The university's management services department is called upon to develop systems tailored to our needs and objectives," Irwin notes. "I wanted to monitor and participate in every step and I had that opportunity."

Con Edison Puts 3 Million Subscriber Accounts Online

The Consolidated Edison Company supplies gas and electricity to nearly 3 million retail customers in New York City and Westchester County, where dense population, old buildings, diverse cultures and a population accustomed to frequent moving present a unique challenge to a service-oriented public utility.

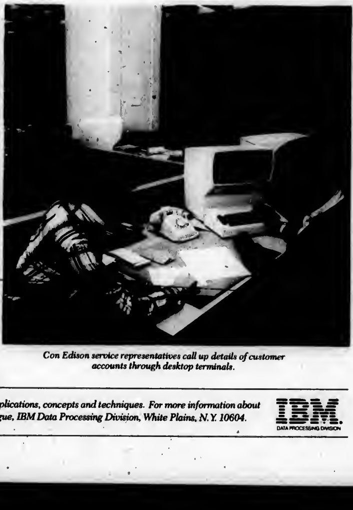
Thousands of customers phone or visit the company each day, for a wide variety of transactions, such as making payments, transferring accounts to new addresses, or to ask for help in interpreting bills. To respond promptly to each requirement, a customer service representative must have access to a great deal of information, such as the payment history of the account, the date of the last meter reading, and details of the building and its energy usage.

Now the representative can retrieve, in seconds, all such information about any subscriber from the IBM 3350 Direct Access Storage Facility, by keying account number or address into a display station. All told, the system responds to 80,000 inquiries or transactions during a typical hour, and 115,000 during peak hours.

To obtain the details needed, the interviewer follows simple keyboard procedures. These are interpreted by the Customer Information Control System/Virtual Storage (CICS/VS) in Con Edison's dual System/370 Model 168's.

Says Joseph B. Sansone, vice president for data processing: "The service representative, whether in a district office, dealing directly with the customer across his desk, or in a telephone office, can make decisions and enter transactions immediately through a desktop terminal. The representative sees and immediately corrects any error, old or new. This responsiveness has given a tremendous boost to customer satisfaction and employee morale.

"We use the Multiple Virtual Storage (MVS) operating system to couple loosely two 168's, which share the transaction load. Together they support over 1,900 3277 Display Stations, and readily handle our peak traffic loads. The online system imposes stringent requirements for error recovery and availability, which have been more than met under MVS. And the 3350 has been a cost-effective alternative for storing the details of our 3 million subscriber accounts."



Con Edison service representatives call up details of customer accounts through desktop terminals.

DP Dialogue is designed to provide you with useful information about data processing applications, concepts and techniques. For more information about IBM products or services, contact your local IBM branch office, or write Editor, DP Dialogue, IBM Data Processing Division, White Plains, N.Y. 10604.

IBM
DATA PROCESSING DIVISION

Must DP Shops Squash DPers' Individuality?

By Miles Benson
Spectai to CW

The Sociology of Computing

Computing folk are often rugged individualists. They're proud of their profession, proud of their abilities and especially proud of their uniqueness.

That's what made Dow Ward and Dick Reid unusual. They came as a pair. If you hired one, you hired them both. It had been that way since college days.

Until they hit the world of Beancounter, Frankincense and Myrrh. As an old, established stock brokerage house, BFM had a bunch of old, established rulas. And tha Ward/-Reid combo just didn't fit with those rules. But that's a little ahaad of the story.

I love the word "synergism." Take the time to look it up now, if you don't alraady know it. It's a cool word to throw around at cocktail parties and computing bull sessions and reports to management.

Dow and Dick wera synergism personified. What Dow did least well, Dick handlad in spades. And at what Dick wouldn't touch, Dow was expert. Between the two of tham, they were quite a craw.

Dick was the salesman of the pair. He could sell a profit analysis program to a nonprofit corporation or a Quadranova Maxicomputer to a cornar grocery. What he knew about people would fill a bubbla mamory.

Dow, on the other hand, was the bashful programmer axtraordinaire. His struotured and modular prose possessad poetic beauty. His documentation would have won a Pulitzar. And his programs ran so efficiently thay flashed like mateors through central memory.

But sell? Dow couldn't sell RPG to a report generator shop.

Delightful Notion

Together, however, thay were wonderful. Dick went out and scouted up customers, and Dow satisfied their technical requirements. "Want a Mark III Frammis system?" Dick would ask a potential customer. "Hare's an improved and generalized Mark III Frammis," Dow would respond aftar a minimal person-month lapse.

In fact, it was Mark III Frammises and XL Thingamabob applications that had put the two of them through P.Q. Aresti U. Dick majorad in Business Ad, Dow was a Computer Scientist, and they had lived and breathed their chosen fields both within and without the classroom.

Working together in collage had succeeded so well they decided to keep a good thing going and job hunt as a team. And personnel people in general wara dalighted with the notion. Hiring two people together was like a two-for-tha-prica-of-one sale, and Beancounter, Frankincense and Myrrh snapped them up on that basis.

Managerial Dilemma

There is a large gap in large companies, however, between technology as practiced and personnel's pictura of how it is practiced. And personnel's delight turned into a managerial dilemma.

BFM had a functionally organized computing shop. If you needed graphics support for an on-line stock prica system, you went to the graphics people. If you needed data base management for an accounts receivable application, you went to the DBM people. If you needed sales support, you went to management.

And there, you see, is the problem. Dow Ward could slide comfortably into almost any technology-oriented area. But Dick, for all his business acumen, wouldn't fit into the picture.

He was too new to manage, too technically ignorant to be a technologist, too well-paid to be put anywhere else in the computing organization.

And to complicate matters, personnel had promised that the two of them could be kept together. Short of a total reorganization, there was no reasonable way to do it.

Bad News, Good News

Well, this story has both a good news and a bad news ending.

The bad news was that Dow and Dick just couldn't hack it separately. Dick was laid off first; his rola in the shop just never materialized. And introverted Dow wasn't far behind. Without Dick's prodding, he sank into a shell and rarely emerged.

You've probably guessed the good news. Dow, once he left BFM, quickly sought out Dick. And the two of them went back to their old tricks. They formed a two-man company and lived happily ever after, neglecting the impact of IRS and capital gains.

Which is really the end of my story. Except for one lingering question that raally bothers ma: Is it possible for a large computing shop to adjust itself to tha rugged individualism of its practitioners? Or must it inevitably try to squash their individuality and (whether it succaeds or fails) losa them?

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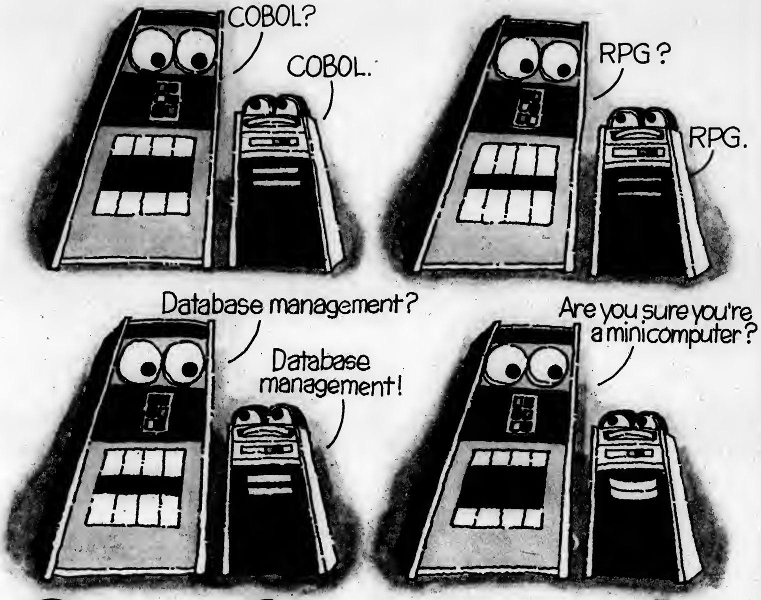
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Reader Commentary

In System Design, Only Three Goals Exist

By John L. Moseng
Special to CW

Much has been writtan in Computer*world* about the benefits of this or that company's new system, yat there are really only thrae basic system design goals or benefits. They are cost savings, more information and timely data.

Cost savings, often necessary to justify a new application, may result in numerous ways. Perhaps personnel can be raduced or, more likely, additional parsonnel won't hava to be added to handle the increasing workload.

Savings may also result by changing the method of data entry. Hopefully savings will result from having more information or having it sooner.

Savings in the user department must be reduced by the increase in DP costs; in other words, the total cost must ba considered. Hoped-for savings may not materialize, however.

Management may nead more information to efficiently carry out its responsibilities. Tha analyst and user must determine what additional information would be useful.

This additional information may not be easily obtained in a manual system. It might be too time-consuming or too costly to do manually, perhaps almost impossible.

Whenaver additional information is raquired, additional input data is often needed. The analyst must determine the additional input needed. This input is usually obtained from tha form that is used to collect the data.

The cost and difficulty of obtaining the additional data must ba weighed against tha possible benefits of the additional information. Often, the additional data is readily available and easily collected by modifying the data collection form (source document). In fact, the information may already be on the form.

The cost of capturing the new input must, in turn, be weighed against the usefulness of information generated as the result of the input. Hard-to-capture input increases the cost of the output, reducing its value.

Of course, some additional information can often be obtained from existing data. This is usually done by manipulating the existing data in a new way. The data base approach may make existing data more accessibla.

"More information" does not mean only an increase in information quantity, but also an increase in quality. Hopefully, as input data is processed, useful information results.

Timeliness of Data

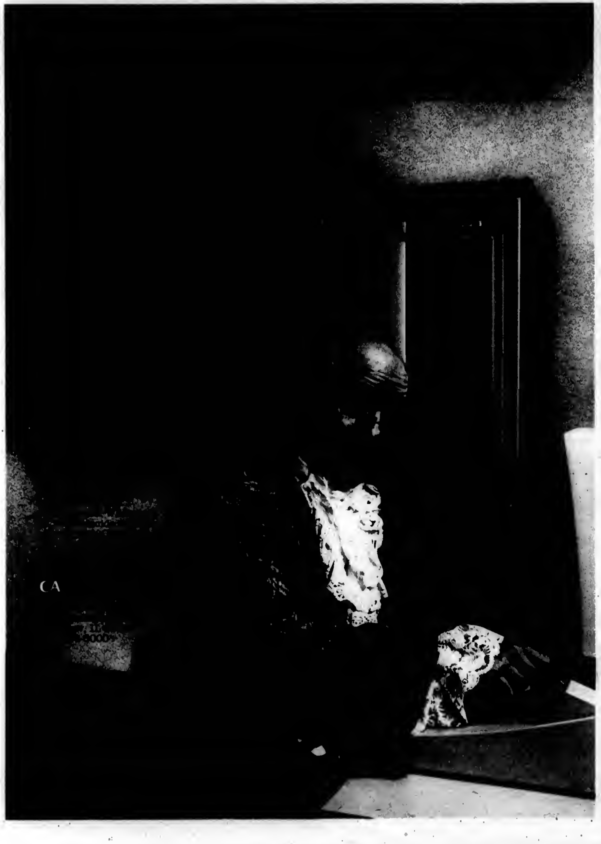
Reports received too late may not be read, may not allow enough time for evaluating alternatives or may contain data whose valua is reduced by time. By converting a manual system to a computerized one, the same report might be available days or even weeks sooner.

If an on-line system is developed, up-to-the-minute information will be available.

An on-line system will make the information more timely; it may even allow for the availability of more information. As information is made available sooner, DP costs increase, yet cost savings may result from decisions based on the timely information. The classic example is inventory control.

A system may be entirely justified on only one of the thrae basic design goals. But the ideal is having more information, soonar, resulting in a cost savings. Usually, ona has to settle for two out of three.

Moseng is chairman of the DP department at District One Technical Institute in Eau Claira, Wis.



Privacy Concerns Important

Free Enterprise at Stake as Industry Grows

By Jim Ryan
Special to CW

Reader Commentary

In view of the present discussions between government agencies and the computer industry on matters of privacy, antitrust, data communications and interconnect policies, it might be wise to think about the future of the computer industry as a free enterprise.

When computers were first used, they were always in-house. The entire operation took place within a single building and was confined to a particular group of people who used the computer for a special purpose. Their work did not affect the public welfare in any way.

As long as this situation existed, there was complete freedom to operate without regulation by the government.

Because of the need for large amounts of capital, the market was confined to customers able to finance the installations. This restricted free enterprise to the extent that the man on the street could not compete with major corporations.

Initially, there were enough major corporations competing with each other so it wasn't necessary for the government to regulate the industry.

As time passed, however, IBM managed to acquire large segments of the total market and eventually it became a defendant in an antitrust suit. The government began looking closely at the computer industry — and free enterprise was in trouble.

The Industry Changes

While IBM was becoming No. 1, the industry itself was subtly changing from an in-house operation to one that could process remote entry data.

This change didn't effect the free enterprise aspects of the business at first because the lines were all private-line leased facilities and the remote terminals were also leased from the telephone companies. There was a clear interface between the regulated telephone company and the free enterprise computer industry.

This condition didn't last very long because a government ruling was made that allowed the interconnection of customer's facilities to telephone company facilities as long as a protective device was installed. This was more like contrived competition, with "Big Brother" constantly monitoring the new policy, rather than free enterprise.

Remote data entry on a private line continued to have some of the elements of free enterprise until it was found certain kinds of data could be transmitted over the message network.

With this technological advance, the computer industry could use a private line or the message network to transmit data. Since it had these choices, it could be drastically affected by any changes made on telephone network tariffs.

The next technological development was the mini- or microcomputer which could make it economical for data to be centralized or decentralized for processing. In connection with centralization/decentralization studies, one of the most significant cost factors had to be the communications network, and any action taken by any government agency to change tariffs could seriously effect the cost factors.

It became clear that the effect of government regulations on the telephone industry had a secondary effect on the computer industry.

It was ironic, but the computer industry had more freedom of choice with mini- and microcomputers; at the same time, it was subject to more regulation on the communications network, a key element of the new systems design. As a result, designers had several choices on the types of computers, but were deeply involved in government-regulated communications networks.

The next technological change was the ability to exchange information between CPUs and to access more than one memory bank. When this became possible, it raised the whole privacy question. Government agencies quickly concerned themselves with this problem because it could affect the public welfare and lead to possible violations of civil and criminal laws.

This further restricted the computer industry's free enterprise posture. It appeared that the more flexible the industry became, the more it became subject to government regulation.

Could it be that the computer industry has free enterprise only as long as computers are designed on a stand-alone basis?

Ryon is a retired DP user.

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Service Stores Source Code for Users

By Don Leavitt
CW Staff

SUNNYVALE, Calif. — The financial stability of a prospective vendor no longer has to be a matter of concern for an installation evaluating a software package because a service now offered by Infogard, Inc. makes such concern unnecessary, a spokesman claimed.

Under the service, Infogard holds critical documentation of a software product, including the source code in machine-readable form, in secure storage. This material becomes available to the licensee if vendor support of this package fails.

A contract among the licensee, the vendor and Infogard assures that all interests are protected, the spokesman said. A user who has no valid license for a particular package cannot gain Infogard's protection, he noted.

Since complete documentation — especially source code — is seldom supplied with licensed software, organizations have been justified in their concern about whether the vendor was likely to stay in business and support the package, Infogard explained. The support was crucial in case program bugs were found or the logic of the software had to be changed.

The Infogard service applies on three levels; the initial activity needed to store the documentation for a given product; care of the material once it is stored; and the activity needed to provide copies of the documentation, and source code, to a user in need.

The initial activity places the documentation in the Infogard system and only the first user seeking the service for a product pays the $150 setup fee that Infogard charges. Once the material is in place, the company charges each user — including the first one — $150 to cover maintenance of the environment in which the material is stored.

Finally, when a user has to retrieve the stored data, Infogard charges another $150. Thus the maximum charged for any one product is $450, but most users will pay only $300.

In outlining the fee schedule, however, the Infogard spokesman noted that new versions of products already stored "have to be considered" new products since they have documentation and source code that differs from what is already in storage. The various $150 charges apply all over again if users want the updated material protected and available to them, he said.

Infogard can be reached through P.O. Box 2097, Sunnyvale, Calif. 94087.

Package Documents RPG Programs

CANOGA PARK, Calif. — Documentation showing the interrelationships of RPG-II source programs, OCL procedures and working sorts reportedly can be generated by IBM System/3 installations utilizing the Pathfinder package from Hawkeye Information Systems.

The utility works for both batch and on-line operations and it supports the "/COPY" facility of RPG's Auto Report, a spokesman said. It can be used with any System/3s, from the Model 8 through Model 15, he added.

Pathfinder provides six basic reports. These include a data dictionary that shows the layout of each file and indicates which programs use the file, which ones use each individual field and how the fields are used.

A system flow chart shows graphically how each program works within the system, the spokesman said:

Three reports focus on OCL — the System/3 user's control language. The OCL-by-File report shows, by disk file name, all programs, procedures and nested procedures within the system. The OCL-by-Program report lists the complete library of programs, shows all files used by each program and the procedures and nested procedures in which the programs are located.

The OCL-by-Procedure/Nested report cross-references all files, nested procedures and procedures and pinpoints the impact of any change in a given procedure, the spokesman said.

The final Pathfinder output — the $D Sort listing — aids the development of new programs by listing all disk sorts already available on the system.

The $1,800 charged for Pathfinder includes on-site installation and training as well as a year's warranty. Hawkeye Information Systems is at 7852 Glade Ave., Canoga Park, Calif. 91340.

'Strobe' Tracks CICS

CAMBRIDGE, Mass. — Improved operations under IBM's Customer Information Control System (CICS) — through application module optimization and data set restructuring — are possible through use of a version of the Strobe program performance management package now available from Programmart.

Strobe/CICS shows where execution time is concentrated and whether that is in the application code or the CICS supervisory modules. Within application programs, CPU time is detailed by location and optionally by source program statement, according to a spokesman.

In this version of Strobe, sampling activity can be started and stopped using simple commands at a terminal, he said, and Strobe profiles of peak activity can be printed while the CICS operations continue.

The support facilities added to Strobe for use with CICS can be used with other on-line systems as well, the spokesman said. This provides an exit through which users can gain module mapping information not available within the normal OS/VS supervisor, he added.

Strobe's ability to report I/O activity as well as execution time is particularly useful for large on-line data base applications, he stated. "File Busy" time for direct access data sets is displayed by unit, volume and cylinder; this can be the basis for restructuring the data base for faster response time, the Programmart source noted.

Intended for IBM OS/360 and OS/VS users, Strobe/CICS support adds $2,000 to the normal Strobe cost of $10,600. Programart is at 133 Mt. Auburn St., Cambridge, Mass. 02138.

PDP-11 Gets WP Support

BUENA PARK, Calif. — Word processing (WP) functionally equivalent to Digital Equipment Corp.'s PDP-8-based system — but supporting many users — is available to PDP-11 users with a package from Data Processing Design, Inc. Word-11 is said to support 60 simultaneous users.

Written in Macro-11 as a sharable runtime system, the package's capabilities include editing based on grammatical entities, but it also supports margin control, justification, centering and spelling error detection, according to a spokesman.

Because Word-11 operates as a job under RSTS/E, conventional time-sharing operations can take place on some terminals while others are used for word processing.

Average job size for Word-II users is 4K words and CPU usage is said to be minimal. Printing can be done on any output device including "daisy wheel" printers, such as those from Qume or Diablo, or line printers.

Minimum hardware required to support Word-11 consists of any valid RSTS/E V6B/C or CTS-500/E Level 2 system running on a PDP-11/34 through 11/70 with 32K words of user memory and a hard-copy printer with upper and lower case fonts.

Word-11 costs $7,500 including manuals and six months of support.

Data Processing Design, Inc. is at 6980 Aragon Circle, Buena Park, Calif. 90626.

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'SPSS/C' Runs on PDP-11

NORTHFIELD, Minn. — An implementation of the Statistical Package for the Social Sciences devised by personnel at Carleton College, SPSS/C was developed to function on small-scale Digital Equipment Corp. PDP-11s, according to a spokesman for the project.

The original SPSS has been described as an integrated system of programs for the analysis of social science data. Intended for IBM 370s and other mainframes, it is said to include well over a dozen statistical procedures that enable the user to perform comprehensive analyses using natural language commands.

SPSS/C Version 2.0 contains "all of the more commonly used SPSS programs," the Carleton spokesman claimed. It will run on a minimum PDP-11 with 28K words of memory, a disk and a terminal, he added.

The new packaging operates under RSTS, RT and RSX environments; changes to allow its use under DEC's IAS or Western Electric's Unix are under development.

Current license costs, which include one year's maintenance, are $600 for academic institutions, $900 for nonprofit, nonacademic organizations and $3,000 for commercial users. Annual maintenance charges after the first year are $300, $450 and $1,000 respectively.

The SPSS/C project is being managed by the director of computing activities, Carleton College, Northfield, Minn. 55057.

Test Data System Adapted To Univac, Burroughs Sites

VALLEY FORGE, Pa. — Datamacs, the test data generator from Management and Computer Services, Inc. (Macs), has been adapted for Univac 1100 series, RCA Spectra and Burroughs medium-scale CPUs, a spokesman said. The package was previously available only for users of IBM 360s and 370s.

Called Datamacs II, the repackaging eases the creation of test files for programs written in Cobol or any other source language and offers the same program test capabilities as the original Datamacs. It can be used as both a stand-alone or a Cobol-embedded program test tool, the spokesman added.

The file processor option of Datamacs is a standard feature of Datamacs II, he added, noting that this feature enables users to extract data records from existing files on a conditional basis and to optionally alter portions of that data.

"Might Well Work"

Commenting on the Spectra implementation, the spokesman said it was the result of a contract; the machine involved was an RCA Spectra 70/45, and although the coding "might well work" on the Univac series 70 — as the Spectras were renamed when Univac took them over — Macs had no direct experience by which it could be sure.

Datamacs II operates under the OS/1100 environment with Univac series 1100 equipment and under DOS with the Spectra CPUs. It can be used with Burroughs B4700s and up under MCPs appropriate for the various CPUs.

Datamacs II is available under license for $12,500 from Macs at 790 Valley Forge Plaze, Valley Forge, Pa. 19482.

'AZ7' Queries Burroughs CPUs

BURLINGTON, Mass. — AZ7, an inquiry system for users of Burroughs Corp. hardware, is available in interactive and batch versions from Azrex, Inc.

The interactive version is suitable for Burroughs B6700 and larger CPUs and for B1700s and B1800s; and the batch version works with medium-size models such as the B3700 and B3800 series, according to Azrex.

The AZ7 system is said to process sequential or index sequential files, to sort on calculated quantitites and to process up to three files at once. It can also process multiple sort stages leading to different reports in different sequences from the same pass of the input file and dynamically vary almost any report formatting parameter, including page length and width, the spokesman added.

Free Form English

AZ7 is built upon use of "straightforward free-form English" designed so that noncomputer personnel merely tell the computer what information they want and the form in which they want it. AZ7 then produces the information that way, he maintained.

AZ7 operates on dictionary tables, needing only one definition in each file's lifetime and containing both structural information and text used for column titles, error messages and input data prompts.

Professional programmers find AZ7 "more than powerful" for one-time reports; or as a test data generator and extractor; fully capable as the report-writing module in production systems; and even helpful in checking out new systems, the spokesman claimed.

Distributed as a self-installing package, the system is priced from $10,000 for a basic batch version to $20,000 for a fully interactive version with all options. On-site support and training seminars are avaiable at extra cost from the firm at 3 Mountain Road, Burlington, Mass. 01803.

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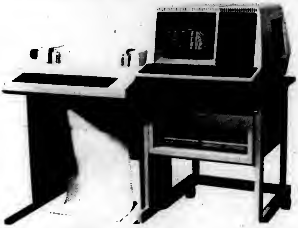

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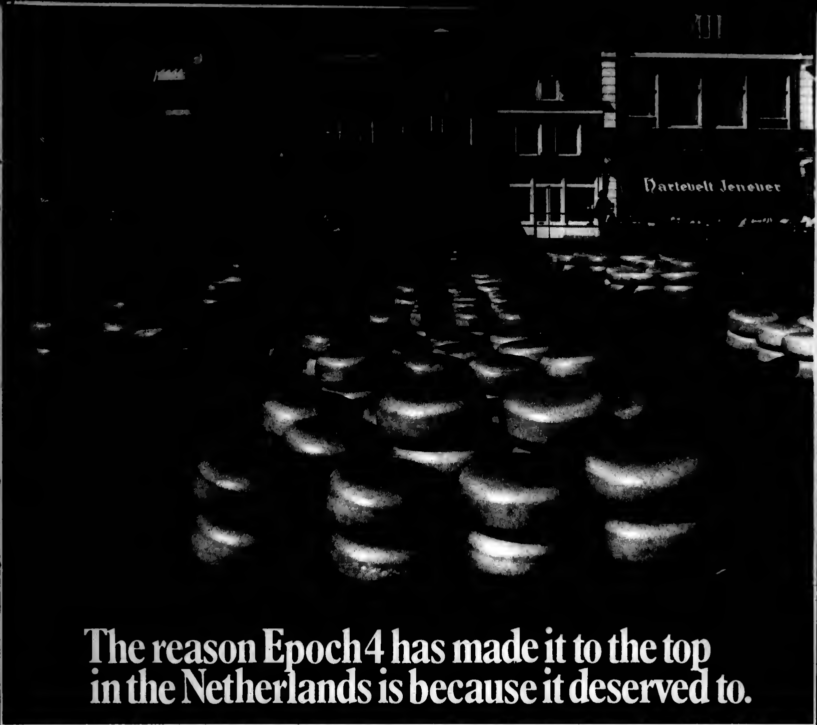

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Data Base Use Adds Life to Classic Complaints

By Stephen L. Robinson
Special to CW

Data Base Corner

This week's two minitopics will reflect some of my favorite peeves. First, the always popular "the computer goofed"; second, "management doesn't understand." The advent of data base has extended the life of, and added new meaning to, these often quoted, but misused homilies.

Yesterday I visited one of my local banks to get a cash advance on my Visa card. Since I have a new Visa card and have not yet extended the credit line, I have a $1,300 line of credit with Visa. Of this total I had about $820 of expenditures accumulated since the last statement, which was paid in full.

My request for a cash advance of $200 was rejected "by the computer." I appealed to the bank manager, explaining I knew there was credit available. "Sorry," was all he said, but he did try a special customer service number in New York.

Since it was just after noon, no one answered in New York (lunch time exodus). The bank manager advised me to try the number myself later since the "computer has been goofing lately," and rejecting a lot of cash advances that people swore should have been accepted.

About an hour later, I got through to a very courteous woman in customer service. She checked my account records and rather politely explained that I had just over $800 in expenditures and $750 in "holds," which put me far over my limit. Indeed, she asked, it's a wonder I was able to make the last several purchases. The concept of a "hold" interested me: What, I inquired, was the nature of a hold?

Patiently, the customer representative explained that when a large purchase is made and the merchant or bank calls in for authorization, a hold is placed on the account for the authorized amount.

"There's your problem," I said. Clearly, you haven't taken off the holds from some of my purchases which have now come in. "Oh no," was the reply, "the computer does that automatically."

"Humor me," I asked. "Retrieve the actual amounts from the hold file and let's see if we can match them up with amounts in the purchase file." Surprise, surprise, every item in the hold file was duplicated in the purchase file.

The customer representative was very apologetic. She didn't know how it could have happened, and she would correct it from her terminal.

I have a pretty good idea how it happened. Since on-line searching and updating is so expensive, I imagine (but confess, I'm not sure) that Visa only removes "holds" during the massive monthly batch billing run. Such system logic, of course, is quite fallacious. However, for the majority of card holders (except around Christmas time) the sum of "holds" and expenditures will never reach the limit anyway.

Many people falsely rejected for credit do not keep close enough tabs on their accounts to realize they are right and Visa is wrong. That leaves the small minority, including myself, who complain, have the situation corrected and are subjected to the universal explanation that "the computer goofed."

I recently presented a data base design course to representatives from a number of government agencies. As part of a workshop exercise, we developed file structures for applications from one of the agencies. One of the seminar attendees, from a different agency, observed that the data elements in one of our proposed files matched, almost identically, the elements in one of his files.

Here, I suggested, is a natural place to demonstrate the effectiveness of the data base philosophy of data organization. We can arrange for the second agency to use the data gathered by the first agency.

"Oh no," was the quick response, "management would not understand."

It is quite true that management probably doesn't understand file designs, but there is one thing that management

(Continued on Page 37)

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'Data Boss/2' Gains Report Writer

N. MIAMI – A report writer facility is the latest extension to Data Boss/2, a data base management system (DBMS) that runs on Digital Equipment Corp. PDP-11s, according to a spokesman for Florida Computer, Inc.

Described as meeting "two-thirds" of the specifications of a Codasyl-style DBMS, Data Boss/2 doesn't support Cobol programs but does work with Basic and Basic Plus. Now, the report writer feature enables users to interactively make queries and set up reports "in a matter of minutes," he said.

The extension formats reports with columns spaced across a page and automatic page numbering. Calculations can be performed on numeric data, he added.

While the new facility provides a number of default options to ease programming, all of them can be overridden to accommodate special forms and formats, the spokesman noted.

Data Boss/2 functions under RSTS/E, which means it is moved in and out of memory as required, the spokesman said. The DBMS, including the report writer, costs $14,000 and is available from 99 N.W. 183rd St., N. Miami, Fla. 33169.

Data Base Use Gives Complaints New Life

(Continued from Page 36)

does understand – MONEY! I don't mean to sound too mercenary. Management is, of course, judged on other than financial considerations, but there is no question that most managers and executives are judged to some extent on monetary criteria.

DP personnel, especially computer analysts and business analysts, must acquire an appreciation for what motivates their management. Only then will they be able to "sell" ideas they know to be valid.

In the case that surfaced during the seminar, we proceeded to cost out the anticipated dollar savings. A conservative estimate was that close to $100,000 per year could be saved by combining the two input activities.

Intermediary Step

At this point, it is sometimes tempting to run upstairs with the great news that you've discovered a way to save the organization $100,000. There is, however, an important intermediary step: to reexamine the business procedures that are in any way associated with the data elements now being gathered at both sites.

If this study indicates there are no logical procedural problems to centralizing the data gathering, we can continue with our transition plan.

The next step is to present management with a proposal to change existing business procedures. The proposal should *prominently* feature a discussion of the anticipated monetary savings.

At this point, you may learn of future organizational plans that might prevent a merging of input efforts (e.g., anticipated changes in one coding scheme, new uses for some of the data, etc.). You may also be presented with apparently illogical arguments such as "I don't trust them to gather the data," "We're not going to reduce our alloted clerks to accommodate *them*," or "If they have access to our data they'll probably foul it up."

Address Arguments

If such arguments have substance, they should be addressed; e.g., what if *we* control the input process, suppose the data base administration group controls access to the data, etc. If the arguments are indeed specious, the analyst faces the moral dilemma that has been explored in other recent *Computerworld* columns: to be silent, knowing that money is being wasted, or to go out on a limb, skipping a level (or more) of management in order to be heard.

For those people uncertain which way to go, I would point out the following: if, sometime in the future, management two levels up becomes aware of the potential savings in the change you explored, your manager will likely find a way to convince his manager that he thought of the idea a while back, but you vetoed it. Sitting on good ideas is rarely a good idea.

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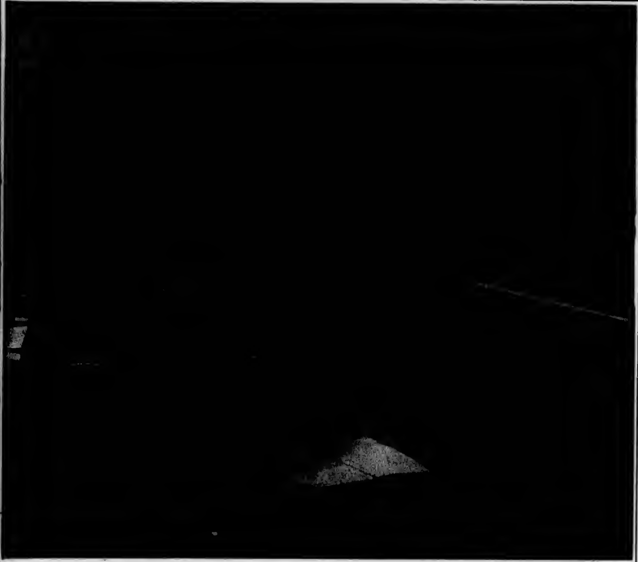

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PERKIN-ELMER
Data Systems

HP Creating System Language, Compcon Told

By Frank Vaughan
CW Staff

SAN FRANCISCO — Some of the concepts behind Syspal, a programming language for operating system implementation that is under development at Hewlett-Packard Co., were outlined at the IEEE Computer Society International Conference (Compcon 78) here recently.

The language will enable users to create unique operating systems to support different types of operations on different machine configurations, if the user can define the desired operations and the machine constraints to Syspal, according to Dr. Robert A.Fraley.

A member of the technical staff at HP Laboratories in Palo Alto, Calif., Fraley said the language is not intended to simply adapt an existing operating system to varied hardware configurations. Syspal combines many of the features of Pascal, Modular, Euclid and Concurrent Pascal, he noted.

HP's purpose in developing Syspal, Fraley said, is to "create a language system which contains many tools for system development in addition to the compiler.

"If the language is to be lucid, its concepts must map directly into the target hardware, yet it must be machine-independent," he said.

Four Components

Intended primarily for internal HP use, the major components of Syspal include the Syspal compiler, a library maintenance program, an interactive runtime system and a language-oriented editor.

The basic program unit is the module, Fraley said. A module contains data definitions, procedures and references to other modules. The compiler is capable of compiling modules as separated units, and the librarian maintains programs, both object and source, in terms of modules, he explained.

Modules may reference one another in two ways, analogous to the two uses of Simular classes: "One technique is to create new instances of the module, either as variables or heap objects. The second technique is to surround one module by another so that all exported variables and procedures of the outer module are known within the inner module.

"Where Simula only allows a single surrounding module, Syspal allows several. The two surrounding modules may not export the same name. The inner module may, in turn, export some of the names inherited from its surrounding modules," he claimed, noting that the module containment diagram becomes a directed cyclic graph instead of a tree.

Concurrency Model

Syspal uses a model of concurrency which resembles that of Concurrent Pascal. Static structures in the program specify code segments which may be operated in parallel, Fraley stated. Unlike Concurrent Pascal, HP's language permits instances of processes to be created dynamically.

The language has a number of specialized modules for concurrent process handling, he explained. "Two of these — the 'Scheduler' and the 'Resource' — replace the monitor of Concurrent Pascal. The other specialized module is a 'Process.' " Procedures and functions are provided as in Pascal, he noted, and are called by the single keyword "Routine." Unlike Pascal, the normal conventions in the routines are not nested. While nesting is permitted for notational convenience, most routines lie at the outermost level within their containing environment.

The anticipated coding rule for Syspal will be that routines occupy a single page with contained routines included. A routine may be designated "in-line," which allows more efficient implementation of the routine reference, and its semantics are identical to those of a standard routine.

The data structures are in many ways the most important part of Syspal, providing the major advantage over HP's previous Systems Programming Language (SPL). These data structures have been modified to provide "safer, more accurate data descriptions," Fraley noted.

"The syntax of Pascal's control structures has been changed to a 'closed' form. Each structured statement allows a sequence of statements where Pascal allows only a single statement."

New Vendor Supports 'Scert'

ROCKVILLE, Md. — Developed and marketed for many years by Comress (now a division of Comten, Inc.), the Scert computer system simulation package is now available from Performance Systems, Inc. (PSI).

Scert includes a number of simulation facilities including the modeling of both hardware and software configurations in order to provide cost/-performance projections of how any workload will perform. Written in Cobol, Fortran and Assembler, the package runs on IBM 360/370s.

PSI will license the package for an annual fee of $35,000, but also provide it on shorter terms (a three-month minimum for $10,500) in addition to on-site consulting support for $350/day, the spokesman said from 30 Courthouse Sq., Rockville, Md. 20850.

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Canadians Using Net To Study Structures

MISSISSAUGA, Canada — The extensive use of sophisticated computer-based structural analysis programs has helped engineers for Ontario Research Foundation (ORF) here solve such client problems as determining the fatigue life of a power plant pressure vessel or evaluating a girder plate for the construction of a bridge.

Much of the work ORF performs in the structural area involves finite element method capability. Some of the software was developed internally; the remainder are programs from Structural Dynamics Research Corp. (SDRC) that are available through Cybernet Services of Control Data Canada, Ltd.

ORF was founded in 1928 as a joint venture of the Province of Ontario and the Canadian Manufacturers Association. Today, it provides contract technology services to clients in Canada and the rest of the world in energy, environment, materials and processes and resources.

An example of how the organization uses its expertise in structural analysis involved a client who asked ORF to determine which section of a power plant vessel was most likely to fail and its probable fatigue life.

The client then asked ORF to find the stress migration from the original failure point to determine where the vessel would fail next. Using the SDRC programs, foundation engineers predicted where and how soon it would fail and the stress migration patterns thereafter.

"After the analysis was done, the client told us that an actual vessel showed high stress concentration in the area we predicted," according to Stan Barclay, assistant director of engineering at ORF. "That vessel and other existing vessels were reinforced in the original area of failure and at the point of stress migration."

Bridge Evaluation

Ontario Research combined the SDRC and other structural analysis programs from Cybernet Services with its expertise in engineering and testing to help another client evaluate a plate girder concept used in the construction of bridges.

In this project, the contribution of the concrete deck to the strength of the steel girder was the factor of prime interest in terms of local stresses generated at the supports. The local stress distribution in the area of supporting piers established by this study produced reliable design parameters to be used in subsequent designs.

ORF first created a model of the girder design and analyzed it mathematically with Superb, an SDRC finite element program. At the same time, a physical model of one-fifth scale was built and tested with strain gauges to confirm that the mathematical and physical models behaved the same way.

Scale model beam is wired for testing at Ontario Research Foundation.

"If the correlation is good," Barclay said, "then model results can be used in full-scale design. In this case, correlation was within 3.5%, which is well within the acceptable range.

"Once a good finite element model is developed, design variations can be readily checked out at minimum cost without further physical testing."

Current analytical techniques, such as finite element computer programs and experimentation, provide foundation clients with more accurate evaluations of loaded structures than can be achieved through hand calculations using classical formulas, according to Barclay.

"With classical techniques," he pointed out, "the simplification was quite major; you had to assume what would happen. It was a judgment job based on the experience of the experimenter, who would decide by feel where the high stresses were and, as a result, would probably have to use far more instrumentation.

"Even then it would be hit and miss that he was picking up the right areas of high stress," he noted.

"Now you can start a coarse grid or macro model to decide where the high stress areas are. Then you can focus on those high stress areas wth micro models and get very precise detail of the area.

"An example we're working on now is railway wheels. It is very important to pinpoint the high stress area because of centrifugal loads within an eighth of an inch. By trial and error methods, that would take an infinite

(Continued on Page 40)

Fujitsu's 50megabyte M2201

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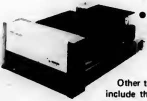

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ISC Installs 'System 1022'

BRAINTREE, Mass. — System 1022, the data base management system developed by The Software House, is now available through the facilities of the Interactive Sciences Corp. (ISC) communications network, according to a spokesman.

System 1022 reportedly includes features that support both the DP professional and the untrained user. It includes a query language, a report writer and a host language interface, the spokesman noted.

The query language provides an English-like format easily learned by the nontechnical user, he said, adding, however, that retrievals through this facility could include multiple keys and logical operations.

The report writer supports "Fortran-like" output conversions, "Cobol-like" PICTURE editing and a wide range of formatting options. In addition to user-specified page headings and footings, the system allows an unlimited number of control breaks and row and column subtotals, ISC said.

The host language interface enables users to CALL the facilities of System 1022 from Fortran or Cobol programs, the spokesman added.

The ISC remote computing network can be reached from 90 cities across the U.S. and from Canada, Europe and Mexico. The operation is headquartered at 80 Brooks Drive, Braintree, Mass. 02184.

Package Aids Finance Plans

DANBURY, Conn. — Genesis, an interactive financial planning system written in APL, is available on the remote computing facilities of Time Sharing Resources, Inc. (TSR) or as a package from Weiss Associates for in-house IBM 360s or 370s.

The system was designed to handle comprehensive computational data bases with lateral and hierarchical consolidations of data including computation of effective consolidated rates, a spokesman stated.

Genesis supports a series of English language commands and prompting messages to build and then use financial models. Once specified, all computations and consolidations are performed when required, he said.

The commands allow either bottom-up or top-down planning and support of "what if" capabilities on detail or consolidated data. A built-in report writer facility produces finished output, he added.

Typical applications with Genesis might include strategic, business or operational planning; cash budgeting; variance analysis; capital budgeting; and manpower planning, the spokesman said.

Used on the TSR facilities, Genesis is available for the network's normal service charges. The in-house package costs $30,000, Weiss Associates noted from 12 Ole Musket Lane, Danbury, Conn. 06810.

Stresses, Strains Studied by User

(Continued from Page 39)

amount of time.

"With the finite element method, you can pick up the approximate high stress areas easily, then search in a small area to find the precise point of high stress."

One of the main benefits of the SDRC programs, Barclay said, is that the software is written in such a way that it is easy for a relatively new computer user to apply sophisticated techniques to problem solving.

Walk-in Service

Another ORF offering is a walk-in service for building finite element models. A client can use a digitizing tablet and a CRT terminal in the foundation offices in this Toronto suburb to build a model for finite element analysis with the SDRC programs.

The client puts the drawing of the structure on the digitizing tablet and moves a cursor over the drawing. Where he wants a point, he presses a button and is given a point or node number and its coordinates.

He can view his model on the CRT terminal in three-dimensional or isometric form to see that he didn't miss or mislocate any points. When he has built his model, he can submit it for analysis by ORF or through his own resources.

"The most time-consuming part of finite element analysis is inputting all the numbers into the computer," Barclay said. "If you automate that, as SDRC has done, then you save an awful lot of time, and this is what we're seeking to accomplish with the walk-in service."

F.D.M. Williams, vice-president of engineering at ORF said the foundation emphasizes the SDRC techniques of integrating finite element analysis and mechanical testing, or computerized systems analysis, "because we want to promote such worthwhile techniques to industry at large so products no longer are produced by the old prototype method where you make 10 and — bit by bit — test them to destruction.

"By using analytical and experimental techniques," he added, "industry can make good use of dwindling resources, especially energy.

"Actually, these techniques have been know for a long time. Cybernet Services gives us the computing horsepower, and SDRC has put these techniques into a usable form. Before that, they were in the domain of the professors, not the users," Williams said.

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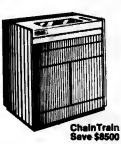

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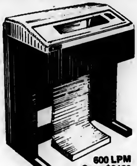

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CW at Interface 78

Users of AT&T Services Seen Facing Price Hikes

By Ronald A. Frank
CW Staff

LAS VEGAS — Users of AT&T services face the prospect that the phone company will continue to raise prices on noncompetitive services, according to consultant Harry Newton.

Speaking at a recent Interface 78 session called "More and More From Bell," Newton told users they will have to pay higher rates for short-haul private lines, direct dial and Wats service. In addition, Bell plans to hike prices for moving and installing equipment.

All this will happen within a framework that attempts to have all services charged on a measured, time basis. In some cases, the rates will be new, such as for incoming busy conditions, Newton said.

In order to cope with this continuing threat of price hikes from the telephone company, users must maintain flexibility in their networks. They can do this by using alternative suppliers such as specialized carriers whenever possible and by combining applications on the same facilities whenever possible, he advised.

As an indication of how Bell regards the data user, Newton pointed out that the 1977 AT&T annual report has a statement of policy that never uses or includes the words "data" or "computer."

There is still little incentive from the Bell System to innovate with new services. Efforts such as Picturephone and Dataphone 50 services have been a failure, Newton said.

Richard Kuehn, another speaker and consultant, said that costs for long-distance dial services will increase and that it is also probable that Wats tariffs will be phased out because Bell will not be able to prove a justification for this type of service from an economic standpoint. If Bell is forced out of Wats by the Federal Communications Commission, it is quite possible Wats-like services will eventually be offered by the specialized carriers, he predicted.

Some type of "value of pricing service" is coming in phone company interstate rates between major cities, Kuehn said.

One alternative for users is to build short-distance local digital nets in urban areas by using point-to-point wire facilities, he said. Bell is already offering local area wire pairs, which could be used with all-digital transmission equipment for about $350 per channel, he said.

CW Photo by R. Frank
Harry Newton

Newton elaborated on this concept and said that in New York City, six large users are utilizing cable TV facilities for local use at rates 40% less than the phone company charges.

Many of the noncompetitive services for which Bell will raise rates will first show up at the intrastate level. For this reason, users should keep close touch with changes being proposed by the phone company before state regulatory commissions, Newton said.

McGill Urges Integration

By Ronald A. Frank
CW Staff

LAS VEGAS — Corporations must stop thinking about various communications functions as expenses that must be minimized. Instead, they should perceive voice, data video, image, message systems, sensor-based data and office operations as part of a single processing system that can benefit the company and contribute to earnings per share, according to Archibald J. McGill, director of market management and development business at AT&T.

Speaking at a recent Interface 78 session here dealing with issues in the informa-

(Continued on Page 42)

IBM, AT&T Show Innovations

LAS VEGAS — Both IBM and AT&T showed innovative equipment in their recent Interface 78 exhibits.

IBM demonstrated its recently announced programmable communications subsystem for the Series/1 minicomputer by attaching IBM and non-IBM terminals to the processor. The two non-IBM CRTs were a Bell System Dataspeed 40/2 terminal and a Lear Siegler, Inc. unit; the IBM terminals included the 4987 and a 5100 processor used as a terminal.

The units were interfaced to the Series/1 on an RS-232 level as the communications subsystem demonstrated message-routing in an administrative message system.

AT&T put on exhibit its Local Area Data Set (Lads), designed for short-distance data transmission. The unit can operate up to six miles at 2,400- and 4,800 bit/sec and up to three miles at 9,600 bit/sec, AT&T said.

Lads is based on the Codex Corp. 8200 and will be part of the Bell local area data service slated for introduction in most operating companies by the third quarter of this year. The speed of the unit is fixed at the time of installation; its tariffed cost is expected to be between $35- and $50/mo.

Bell also showed a version of the Plantronics Vuset CRT with an alphanumeric keyboard. Operating at 300 bit/sec, the small CRT was demonstrated working with an IBM 370/155 in New Jersey.

The alphanumeric version of the CRT, which will be available in dial-up and private-line models, is compatible with Bell 103 or 113 data sets. Tariffs for the unit will range from $45- to $60/mo, AT&T said.

AT&T also demonstrated a Model 43 teleprinter from Teletype Corp. operating with a Dimension PBX. A data security feature on the PBX conditioned the phone line for the terminal, AT&T said.

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Users Pleased With Multiplexer Performance

By Marguerite Zientara
CW Staff

DELRAN, N.J. — Prospective users of data communications line multiplexers can expect good overall performance from major vendors' multiplexer offerings, the results of a recent survey indicate.

In its report, "All About Data Communications Multiplexers," Datapro Research Corp. found users of the Infotron Systems Corp: 180 time-division multiplexer (TDM) were pleased enough with its overall performance to give it an "excellent" rating. All 54 users surveyed gave their multiplexers an average overall performance rating of 3.4 points on a 4-point scale.

Since some users surveyed were using more than one type of multiplexer, a total of 315 multiplexers, largely from five vendors, were rated.

The users were asked to score their multiplexers' overall performance, hardware reliability, maintenance service, ease of installation and ease of expansion with a rating of 4 for "excellent", 3 for "good", 2 for "fair" and 1 for "poor".

Digital Equipment Corp.'s DH11 series and the Timeplex, Inc. T-20 (both TDMs) tied for second place with a rating of 3.7 in overall performance. The Codex Corp. 910 and Infotron 780 (also TDMs) shared third place with a rating of 3.6, the report indicated.

In the area of overall performance, no multiplexer received a rating lower than 3.0. That score was shared by two General Datacomm Industries, Inc. products, the frequency-division multiplexing (FDM) 1101 and the TDM 1202.

The Infotron 180 got a second perfect score in the area of hardware reliability, an area where the average rating was 3.2. General Datacomm's FDM 1150 followed with 3.5, and the Codex 910 was third with 3.4.

With a 2.8, the Timeplex T-96 TDM was rated the lowest in this category, according to the report.

Low Upkeep Scores

Maintenance service was the category rated lowest by users, with an average of 2.6. The lowest rating in the survey (1.7) was given in this area to General Datacomm's 1101.

The highest rating in this category was again for the Infotron 180 (3.3), shared equally with the Timeplex T-20, the survey indicated.

Rated on ease of installation, the Infotron 180 once again led with another perfect score. The Timeplex T-20 was second with a rating of 3.3, followed by the Infotron 780 with a 3.2 rating.

The low score in this area was again captured by a General Datacomm product, this time by the FDM 1150, with a rating of 2.2. The average rating in this category was 2.9, Datapro said.

Users gave ease of expansion scores an-average rating of 2.9, with the Infotron 180 again claiming first place with 3.8. The second highest rating also went to an Infotron product, the 780, which received a 3.6. The Codex 920 came in third with a 3.5.

The lowest score in this area was 2.0, again given to General Datacomm's 1101.

The survey included several ques-

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McGill Urges Integration

(Continued from Page 41)

tion age, McGill said the average company has invested $25,000 in each production worker, but only $1,500 in office workers engaged in corporate communications functions.

Companies today are typically organized into two separate areas, McGill noted. A vice-president of DP will generally have control over data communications while a vice-president of administration will control such things as office services, voice communications, word processing and inplant printing.

In order for these now dispersed functions to contribute to corporate earnings, the management structure will have to be integrated, McGill contended. A director of information systems should oversee the various communications functions as part of a total applications-oriented structure, he suggested.

Telecommunications operations based on those applications can streamline personnel-intensive functions and contribute to the per-share earnings of a corporation, McGill said.

Some AT&T customers have already begun to look at their communications in a different manner and 34 "leading edge" customers have already organized according to this integrated approach, he said.

According to McGill, communications should be viewed as having three major segments: remote, travel and face-to-face types. Remote communications include electronic methods such as voice and data sensor control and paper methods such as text preparation and mail. Travel encompasses business, leisure and commuting; face-to-face types include conversion, discussion and delivery.

Today these functions are fragmented and their broad relation is not well understood by many executives, McGill said. If they can be integrated within corporations, he predicted, by 1985 $400 billion will be spent on communications instead of the $150 billion spent by industry in 1975.

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Multiplexers Pleasing Users, Datapro Finds

(Continued from Page 42)

tions to determine multiplexer usage patterns, including low-speed line types and speeds used, high-speed line types and speeds used and multidrop usage.

Type of Facility

All but 13 responses indicated the type of facility used between the terminals and the multiplexer. About 20% used the public telephone network, and about 60% used leased lines to establish the low-speed connections, according to the report. A few used private or direct connections.

With responses on 79 products, Datapro found 59% of those users used a speed of 300 bit/sec, with 32% using a speed of 1,200 bit/sec.

Output Choices

On the output side, 50 responses indicated usage of a private voice-grade line; 16 responses indicated usage of a private network; and 13 responses inidcated usage of a communications facility other than a leased line or private network.

Only the users of TDM multiplexers consistently reported speeds for the output side, according to the report. Of 57 TDM responses, 43% had a speed of 9,600 bit/sec (high-speed), 35% used 4,800 bit/sec and 33% reported a speed of 2,400 bit/sec, according to the survey.

Dispersed Multiplexers

In response to a question about the use of geographically separated multiplexers feeding the same line, 57 responses indicated that all feeder lines were terminated at the same location, and 16 responses indicated waystations were being used.

According to the report, 38% of the responses to the survey were sent by users who began using multiplexers during 1977.

Problem Areas

Based on the total sample, the survey found 25% ascribed significant difficulties to line outages, followed by 20% who ascribed difficulties to line quality. Nineteen percent found the hardware was the root of the problem, while 15% felt diagnostic facilities were troublesome.

Eleven percent blamed modems for problems and a mere 2% cited control code recognition as culpable, according to the report.

The 27-page report is available for $12 from Datapro at 1805 Underwood Blvd., Delran, N.J. 08075.

Data 78 Set for Toronto in April

TORONTO — The Data 78 data communications conference and exhibition will be held April 4-6 here at Sheraton Centre.

Data 78 will include exhibits by both U.S. and Canadian vendors. Session topics include "Objectives of Network Architectures," "Trade-Offs in the Use of Public vs. Private Data Networks," "The Economics of Virtual Data Links" and "Software in Network Management."

A featured speaker will be Prof. Marshall McLuhan and those speaking at technical sessions include Dr. Dixon Doll, consultant; Ian P. Sharp, president of I.P. Sharp; Murray Robinson, consultant; and John E. Fox, vice-president for marketing with Satellite Business Systems.

Special sessions are planned on the merging of voice and data, X.25 protocol and network architectures, Infoswitch vs. Datapac, electronic funds transfer systems, satellite communications and computer-based message systems.

Additional information about Data 78 is available from the conference organizers at Suite 2504, 2 Bloor St. West, Toronto, Canada M4W3G1.

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Virtual Data Link Gives Remote User Control

SLATERSVILLE, R.I. — A decision last year by North American Philips to provide DP services to all of its operating companies through two regional data centers presented an opportunity — but also a problem — for one of those companies.

The decision afforded Amperex Electronic Corp., headquartered here, the opportunity to connect to a virtual machine at a potentially substantial cost saving. The problem Amperex faced was how to make that connection without losing the capability offered by its own IBM 370/135.

Peter J. Horn, DP director at Amperex, said he found the answer in a "virtual data link" supplied by Paradyne Corp. Called PIX-II, the virtual data link allowed Amperex to replaced its in-house mainframe while maintaining the same level of control over the execution of its jobs on a processor miles away, Horn said.

The PIX-II lets Amperex's unit record gear and its IBM 3270 on-line terminals here operate as if they are locally connected to the mainframe at North American Philips' data center in Manhattan. The Paradyne system provides a synchronous Data Link Control (SDLC) path between these two locations and will permit Amperex to extend computing capability to other manufacturing facilities in Rhode Island just as easily, Horn indicated.

Central 'Black Box'

North American Philips decided to expand its data center concept after a study of the company's operations by a consulting firm. "The parent company wanted some controls on its DP costs, since the total expenditures by operating companies was increasing rapidly," Horn explained. "Its idea was to establish a central 'black box' and let the operating companies tie into it."

Horn said North American Philips also wanted to preserve the autonomy of managers at each of its operating companies. For that reason, it decided upon the virtual machine concept.

"That way, each company could continue to do its own thing, using its own operating system in a 'time-slice' of VM, just as if it still had its own computer," he noted.

The parent company's decision meant Amperex would have to abandon its in-house computer in favor of the corporate data center in Manhattan. Horn reasoned, however, that if he made the right choice of remote site hardware, Amperex could maintain control of its DP operations while gaining the advantages of a virtual machine.

Three Needs

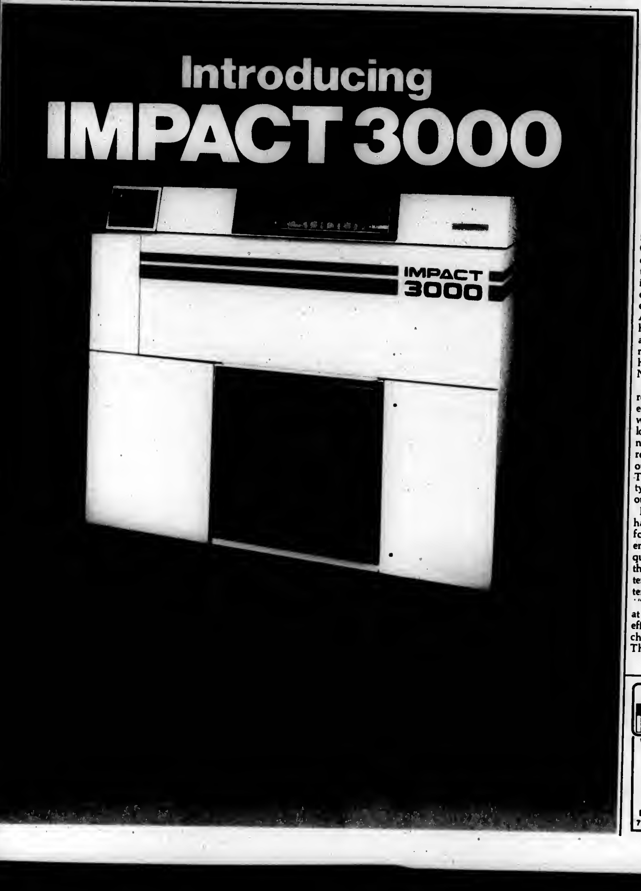
Horn evaluated equipment from IBM and Data 100 Corp., in addition to Paradyne's PIX-II system, with three functional requirements in mind: he needed remote job entry equipment to control the execution of task on the North American Philips mainframe; he needed a system console; and he needed on-line terminals to replace the local CRTs he had in place at Hicksville, N.Y.

"We considered IBM 3777 remote job entry terminal equipment and were pleased with it," Horn said, "and we looked at the IBM 3786 terminal as a DOS/VS console to replace the 3215 attached to our own 370/135 processor. Then we had to worry about tying in 3270 equipment for our on-line system."

Horn said Data 100 could have supplied replacements for the IBM 3777 remote job entry equipment Amperex required, but added he would then have had to obtain a system console and interactive terminals from IBM.

"It was then that we looked at Paradyne's PIX-II which, in effect, extends the multiplexer channel on a 370 processor. Through the PIX-II we could

(Continued on Page 46)



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The terminal including modem sells for $1,075. The P1-11 without modem sells for $800 from 1330 E. State St., Rockford, Ill. 61108.

PIX-II Gives Remote User Control

(Continued from Page 45)

attach not only the card reader, card punch and printer we required, but also the system console and the on-line CRTs we needed, and we could communicate from all of those devices via SDLC protocol over a single telephone line," Horn said.

Major components of the PIX-II are a Local Control Unit (LCU), which plugs directly into the byte multiplexer channel of the mainframe at North American Philips' regional data center, and Remote Control Units (RCU), to which peripheral devices are attached.

By placing intelligence at both ends of point-to-point communications links or at each node in multipoint networks, the virtual data link supports full-duplex communications under SDLC without the need to implement Vtam/NCP teleprocessing software at the host, Horn said.

"If we had kept our own mainframe, we would eventually have relocated it to Rhode Island, where Amperex is expanding its electronic component manufacturing operations," he noted. "Now, using PIX-II, we can provide Rhode Island with more effective computing capability than we would have had simply by installing an RCU and attaching to it the peripheral devices we need."

One Phone Line

As Amperex continued its evaluation of IBM, Data 100 and Paradyne, Horn recalled, it discovered equipment supplied by either IBM or Data 100 would have required a minimum of five telephone lines: one for the unit record gear, one for the CRTs and one for the system console, for a total of three lines from Manhattan to Hicksville; and two lines to Smithfield, R.I., for the unit record cluster and on-line terminals, respectively.

Paradyne's PIX-II system, by contrast, required a single phone line from Manhattan to Hicksville, rather than five, and only one pair of modems; it requires only one line and one modem pair for Rhode Island.

And instead of operating in a total remote job entry environment, as would have been the case with either IBM or Data 100, peripheral devices at both Amprex locations function in the local mode.

"For our part, the ability to operate remote peripheral devices as if they were locally connected to a mainframe means we do not have to make any changes to our Power job control language or retrain our operators on any new Power/-VS commands. Also, we don't have to bother to upgrade from the local to the remote version of our teleprocessing monitor, Minicomm," Horn said.

Cost Savings

Horn estimated that the Minicomm conversion alone, if necessary, would have involved a one-time charge of approximately $2,000. The three additional communications lines Amperex would have required if it had not installed Paradyne's PIX-II would have cost the company approximately $18,000 per year.

"The major potential cost advantage to us is the ability to connect to the parent company's mainframe, to displace our own CPU and to use the remote peripheral and other system resources," Horn said.

"We no longer have to worry about the cost of upgrades to our own system where, for example, we might have had to buy a 100 million character disk even though we required only 30 million characters of additional storage.

"By using the facilities of the North American Philips regional data center, we stand to obtain greater capacity at a lower cost. We'll pay only for the piece of the system we use."

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BASF invented magnetic tape back when IBM's growth was still in the cards.

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Computer Tape Disk Packs
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BASF The Original.

Tester Works as Monitor, Analyzer, Simulator

MOORESTOWN, N.J. — A data communications test and diagnostic instrument has been introduced by Spectron Corp.

The D-502B Datascope can be used as a data monitor, an analyzer and as a simulator and tester, according to the vendor.

Weighing less than 25 pounds, the D-502B offers a time-correlated full-duplex display of 375 characters; switch selection of program listing, output buffer contents, timers, counters and CRC display; and switch control of framing, code level, languages, markers, idle suppress, synchronization, sync reset, speed, independent inversion of data sense for send or receive and bit order reversal.

It also offers composite video output; printer option; parallel interconnection with electrical isolation; test points for access to the interface leads; external signal input/output jacks for sync reset, marker input, marker output and stop.

The Datascope Model D-502B is further extended by a series of adapter and accessory options that include a full alphanumeric keyboard, tape unit, program storage adapter, remote connection units and interface adapters.

In use as a data monitor to isolate software, hardware and communications problems, the D-502B provides direct monitor operation with no programming necessary, a spokesman said. It is compatible with all line disciplines, protocols and codes, he added.

As a data analyzer, the D-502B was designed to measure line utilization, response times and block error rates.

When used as a data simulator and tester, it allows testing of software, modems, communications lines and terminals, both on-line and off-line. In addition, it can be used to simulate any protocol and line discipline and to monitor both test sequence and response, the spokesman said.

The Datascope D-502B costs $10,800. Spectron is at 344 New Albany Road, Moorestown, N.J. 08057.

Ann Arbor Adds Keyboard

ANN ARBOR, Mich. — Ann Arbor Terminals, Inc.'s Model 400E terminals are now avilable with the KB400M keyboards, intended for use in specialized computer applications requiring the operator to call up pages of data via the use of specified codes, the firm said.

The keyboard consists of three 12-key pads. One is for numerics only, one contains cursor control and functions keys and the third has 12 function keys.

The units' refresh memory, which stores 2,000 characters, is standard with a display format of 24 lines by 80 characters and an extra line of memory that is accessible in either "roll" or "scroll" modes. The RS-232C interface is standard, as is the RS-170 video output for driving auxiliary monitors. Three character accents — blink, dim and reverse-video — are also standard. The cursor is displayed as a blinking field, the firm said.

Available options include user-specified output codes and key legends as well as upper/lower case character display, 40-character line and double-high characters.

The single-quantity price is $1,100. Delivery is eight weeks from 6107 Jackson Road, Ann Arbor, Mich. 48103.

Telenet Offers Discount Plan

WASHINGTON, D.C. — Telenet Communications Corp. has introduced a volume discount plan for users of its public packet network.

Under the plan, which went into effect on Feb. 1, customers with monthly billings of over $5,000 pay a lower rate on charges above that amount. The size of the discount ranges from 20% on monthly billings between $5,000 and $9,000 to 50% on billings over $18,000.

The key items covered by the plan are traffic charges for the amount of data sent through the network; monthly charges for private dial and leased channel ports, including multiple connection, rotary and private network features; and usage of local public dial-in ports.

Economies of Scale

The lower rates for higher volume users reflect Telenet's economies of scale in providing network management and other services for these customers, a spokesman said. He added that a customer with several data centers connected to the network in different locations can, in most circumstances, combine charges to qualify for the discount.

With the Telenet discount plan, customers will reportedly be able to significantly lower their hourly communications costs. For example, the incremental cost of public dial-in service in the major cities (including traffic and connection time) will be approximately $1.90 an hour at the 20% discount level and as low as $1.20 an hour at the 50% level.

Telenet Communications Corp. is headquartered at 1050 17th St. N.W., Washington D.C. 20036.

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At Bank of America

Micr Units Take on 10 Million Item/Day

SAN FRANCISCO — The Bank of America here, which normally processes an average of 10 million documents daily, has processed as many as 13 million documents in a single day.

The processing was done on 28 IBM 3890 document processors backed by the computing power of 12 large-scale systems: two IBM 370/195s, six 370/168s and four 360/65s.

The CPUs and document processors are located in two data centers, one in San Francisco for the northern area, and the other in Los Angeles for the southern area banks.

A magnetic ink character recognition (Micr) services unit is part of each data center. They are responsible for the Micr processing items received from branch offices, departments and other banks. Approximately 488 branches send work to the North Center, and the remaining 585 branches send their work "South."

Long distances must be covered (north to Oregon and south to Mexico), which add additional pressure to Micr processing timetables in the centers. Nine airplanes and several hundred automobiles provide the needed courier service between the branches and data centers.

In order to contend with the large document volumes and provide better service to the branches, each Micr services unit installed 14 document processors.

Previous System

Previously, IBM 1419 reader-sorters and 1419-like machines were used to process drafts against the bank ("on-us" items), while still different equipment was used for the transit work. "We felt the 3890 was the only machine that would allow us to combine transit and on-us work under one software system, one machine type and one physical department," according to Andy Cote, vice-president and head of fund transfer research and control. "This was primarily because of the 3890's high productivity."

"We needed a high-volume machine," according to Tom Longworth, vice-presient and manager of Micr services at the South Center. "Our document volume was increasing as our branches developed more applications. We still had only 24 hours in the day to get out the work so we needed more efficient processing.

"In addition, our level of exception processing because of nonreads was reaching a scary height. Exception processing has to be kept at the lowest possible level or it can put you out of business," he noted.

"We wanted a machine that would allow us to do a single-stream proof of deposit," Dick Clarke, Longworth's counterpart at the North Center, said. "Today, we have 100 branches running on a proof-of-deposit pilot program and we are studying the benefits."

Fine Sorting

Currently, the bank uses its 1419s, 1419-like machines and the 3890s to do fine sorting. A benefit study is being performed to determine the value of completely replacing the bank-owned 1419s with additional 3890s. It has been estimated that a total of 24 machines at South and 22 at North would be needed to do all the check-processing work.

A benefit realized through Bank of America's use of the IBM 3890s is the reduction in the reject rate. A 40% to 45% decrease in rejects has been achieved. A high-speed reject re-entry system processes the on-us rejects with a 94% recapture rate. In this way, the volume of exception processing caused by rejects (nonreads) has been greatly reduced, the bank claimed.

A second benefit has been increased productivity. "We've been able to increase operator productivity in our sorter operation," Dick Clarke said, "because the additional pockets (13 on the 1419 vs. 24 on the 3890) have allowed more end points on the prime pass. The increased speed of the 3890 over the 1419 provided greater throughput (the Bank of America is achieving 3890 throughput of 80,000 items per hour); and once the 3890 is mastered, it will be easier to operate than the 1419.

"Beside improving productivity in sorter operations, the inherently lower reject rate of the 3890 has reduced the reconcilers' work load and the number of slow-speed rejects sent back to the branch," he pointed

(Continued on Page 50)

Medium-Scale System Helps College Solve Record Problems

SAN DIEGO — Remember rushing for classes at college, the seemingly infinite line for registration, record checks and scheduling problems? Those perennial problems for both students and administrators have been virtually solved at National University here through the use of a medium-scale system.

"A student is always first in line at national," Dr. David Chigos, president of the 2,400-student university, said.

"We can register students for their entire degree any school day of the year. They can see counselors almost instantaneously,

(Continued on Page 54)

Students at National University in San Diego are benefiting from improved access to record and other data through a computer-based access system.

Datapro Finds COM Advancing, But Not Displacing Printers

By Tim Scannell
CW Staff

DELRAN, N.J.— Even though computer output microfilm (COM) hasn't displaced traditional forms of computer output or revolutionized that aspect of DP, it has nevertheless made considerable progress both technologically and in the number of units installed, according to a report recently published by the Datapro Research Corp.

"All About Computer Output Microfilm" details, in part, the pros and cons of COM and explains why it hasn't generated the enthusiasm that was originally predicted.

"The early excitement ... was based upon predictions that COM would replace impact printers," just as optical character recognition (OCR) systems were supposed to replace "traditional forms of computer input such as manual keying," the report stated. Both techniques, however, failed to achieve the goals set for them, Datapro observed.

Many disadvantages of COM remained, even though "it could be shown that a COM unit could 'print' data much faster than a line printer, that film was cheaper than multicopy forms, that the end product occupied much less space than printed reports, that distribution costs could be slashed, and that if occasional hard copies were necessary, a reader/printer could easily produce them," the report pointed out.

Disadvantages include an incompatibility with certain applications "where the data base must forego frequent and rapid changes"; the user's inability to "make notes, mark pages ... or use it at all without a microfilm reader"; limited retrieval techniques "in the opinion of many users and prospective users"; and poor file integrity, "because it is easy to remove one fiche or

(Continued on Page 58)

Are You a Used User?

Have you ever purchased used computers or used computer equipment?

If you have, *Computerworld* would like to be able to share some of your experiences with its readers. We would like to run a series of articles on used computers, dealing with the following:

From whom did you buy the equipment — another user, the original vendor or a used computer dealer?

What type of warranty did you get? Did the seller keep the warranty, or were you left holding the bag?

Did the system operate as advertised?

How well did it survive shipping?

Did you get any surprises you weren't expecting?

The used computer purchase can be one of the best or worst experiences in a user's professional career. Help us and your fellow readers by writing up both your good and bad experiences.

Submissions should be between four and five typewritten pages, double-spaced, 65 characters to a line. Send articles to Frank Vaughan, c/o *Computerworld*, 797 Washington St., Newton, Mass. 02160.

If you are interested in submitting a story, but aren't quite sure where to begin, feel free to call Frank at (617) 965-5800.

Bank's Micr Units Handle 10 Million Item/Day

(Continued from Page 49)

out. "The microfilming feature has eliminated the need for a separate microfilm department, and the southern center has realized a reduced load in the adjustment department.

"Overall, considering all employees of both Micr service units, we've increased our productivity by 12% as a result of using the 3890," he said.

Longworth, concerned about employee morale, added, "The sorter operator and reconciler tasks tend to be monotonous, but the 3890 has enriched these jobs. The sorter operator has become more of a technician, and the reconciler is able to spend his other time more meaningfully since there are fewer incorrectly read items and fewer nonreads.

"The sheer volume of our adjustments made them nearly unmanageable," he added. "We're now reducing this workload and increasing our ability to manage it effectively. This is because of the reduction in exception processing.

"Since January 1976, we have had no high-speed processing hold-overs in work received. Before the 3890s, we held over fairly frequently. Even so, we're still learning to use all the capabilities of the 3890 — we'll continue to receive additional benefits for some time yet," he added.

The use of the 3890, more courier service and other innovations have improved Micr processing in the North Center, according to Clarke. "We're now meeting 99.9% of our Micr commitments to our branches," he said. "That is, we are getting all the work — including accompanying reports — out the door to the branches by the established deadline 99.9 times out of 100. In 1975, we were meeting these commitments only 96% of the time."

Operator Training

Another recently completed project at Bank of America is the 3890 operator training course instituted in the first quarter of 1977. IBM assisted the bank in developing a formalized training program built around three video films and a workbook. Introduction, operation and maintenance of the 3890 document processor are covered. The films were professionally produced and directed.

"The value of the video films," Davis explained, "is that it is now economically feasible to train only one or two people at a time, since it's not necessary to tie up an instructor. We used to have an instructor teach a formalized class and we needed to wait until we had six or eight students before it was economically justifiable to hold it."

As an alternative to moving work manually to and from the desks of 200 reconcilers, the North Center is piloting a mailmobile. This automatic, battery-operated runner delivers unbalanced work and picks up completed work from the reconcilers on a scheduled basis. Efficiency and timeliness is expected to improve with the acquisition of this mobile unit.

A final bank endeavor that is expected to have a significant and favorable impact in the reconciling and adjustment areas is the IBM 3600. This system is now being programmed and tested in the North Center.

Initially, the 3600 will be a stand-alone minicomputer system that will be used as a tool to aid in reconciling. As adjustments are entered through the system terminals by the reconcilers, the 3600 system will print the adjustments, balance the control groups and store the data, which will be ultimately transferred via tape to the main computer files. The 3600 could be attached to an IBM 370 via a teleprocessing link, the bank added.

The most significant anticipated benefit of the 3600 system will be the clarity of the adjustments. Currently, many of the adjustment slips are incorrectly filled out, incomplete or illegible; when sent to the branches, they must be returned to the adjustment department, the bank explained.

Of the incoming adjustments to the North Center adjustment department, 17% are returns from the branches because of illegible or incomplete slips. Use of the 3600 will standardize information required on the adjustment slip and eliminate illegibility, which is expected to reduce the adjustment department workload. The reconciler, whose job will be enriched through use of the 3600, should become more productive, because the 3600 will take over total balancing. It is estimated that this will increase productivity by 10%.

The 3600 system will provide an element of production control through what amounts to on-line reconciling, the bank noted. Adjustment statistics maintained by the system will relate the adjustments to specific sorters, reconcilers and originators.

Noise-Cutting Cabinet Fits Teletype Model 40

CITY OF INDUSTRY, Calif. — The Van San Corp. has announced a noise-reducing cabinet enclosure for the Teletype Corp. Model 40 printer.

The 1720 series cabinet is available for 80- and 132-column tractor, friction-feed and forms-access Teletype Corp. printers and is designed to place the machine at operational height, the firm said. The unit is equipped with mounting rails, on-line/off-line switch and filtered AC wiring.

The 1720 costs $378 in single quantities with OEM discounts available from the Van San Corp., 1180 Centre Drive, City of Industry, Calif. 91748.

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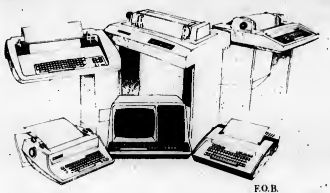

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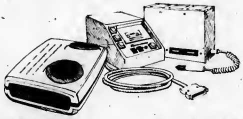

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Card Reader Bows

DAYTON, Ohio — The Standard Register Co. has released a card reader for use in label-preparation systems that can read 80-column tab cards at speeds of up to 285 card/min.

The Model 200 reader uses a phototransistor array to read punched cards in serial, column-by-column fashion, using an infrared light source, the firm stated. The unit holds up to 550 cards at one time and uses transistor-transistor logic circuitry.

Reads All Data

The unit can be programmed to read and transmit all data for a label regardless of the number of cards required to hold that information, a spokesman said.

The Model 200 reader is priced at $6,950 and is available for delivery in 90 days from The Standard Register Co., P.O. Box 1167, Dayton, Ohio 45401.

The Model 200 card reader can read 80-column tab cards at speeds of up to 285 card/min.

College Gets Record Assist

(Continued from Page 49)

and they can look at their records whenever they want," he added.

The key to eliminating troublesome lines has been an IBM 370/138 medium-scale system. More than 60 IBM 3270-type CRT terminals make relevant student and administrative records available to the 80-member staff and the students themselves.

"We do as little as possible on paper," Chigos said. "We put everything we can in the computer data base. It not only eliminates 90% of our paperwork — which is costly and inefficient — but it keeps our records constantly up-to-date.

"It also makes our job as administrators a lot easier. By letting the computer do most of the processing and recordkeeping, we have more time to be people-oriented," he pointed out.

For example, he said, a newly created course goes immediately into the computer-stored curriculum so that all counselors know about it at once — there's no memo to get lost in office mail or in a stack of paperwork on a desk.

A student never has to worry about not being able to see a finance officer because another clerk has taken his file. The file is always in the system where all authorized administrators can get to it simultaneously.

And with 60 CRTs for a staff of 80, there's little waiting to get at the CPU.

Business Degrees

National students place a premium on time-saving systems. They are business executives, top-ranking military officers and high-level local government officials working for bachelor's and master's degrees in business administration under a unique program.

Students take one course per month as they earn their degrees. Classes meet two nights a week, four hours each night and for eight hours one Saturday per month. (One Orange County police chief and three of his aides drove 200 miles round trip to attend each class.)

The flexible scheduling enables students to miss a month for business or personal reasons without losing credit for an entire term or having to wait months before a new semester starts. This makes daily enrollment necessary and "we couldn't do it without the real-time computer," Chigos said.

"A person can come in, sit down for 45 minutes and we'll lay out his entire curriculum — by class, instructor, meeting time and room — for the entire degree," he said. "The student never has to come in again.

"If he wants to change his schedule, we can do it easily and instantaneously on the computer terminal."

Access Via Credit Card

A program called "Operation Access" enables students to use a bank or store credit card with a magnetic strip and a personal code to access their records on a terminal screen. Several hundred students use the system daily, Chigos said.

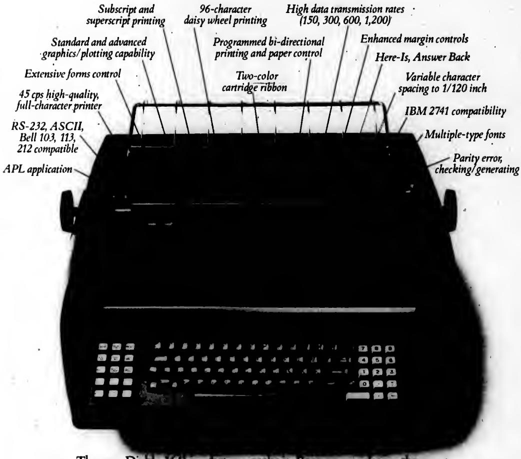
The computer system benefits not only students, but the administration as well. "It gives more comprehensive and timely information for making business decisions than we could ever get by more conventional means," Chigos said. "We can extract information from the computer in 1,029 ways.

"For instance, I can look at class schedules and student rosters for the next two years by using the terminal right by my desk. We have about 200 faculty members teaching courses, and enrollment statistics can tell me whether we need to add more classes or step up our student recruitment effort," he explained.

The computer also has enabled National to double its enrollment without significantly adding to the staff, Chigos said.

Another advantage has been reducing the problem of administering the Veterans Administration benefits program. Work that once took a month to do by hand now can be completed in four minutes, the university claimed.

You can't judge this Diablo terminal by its cover.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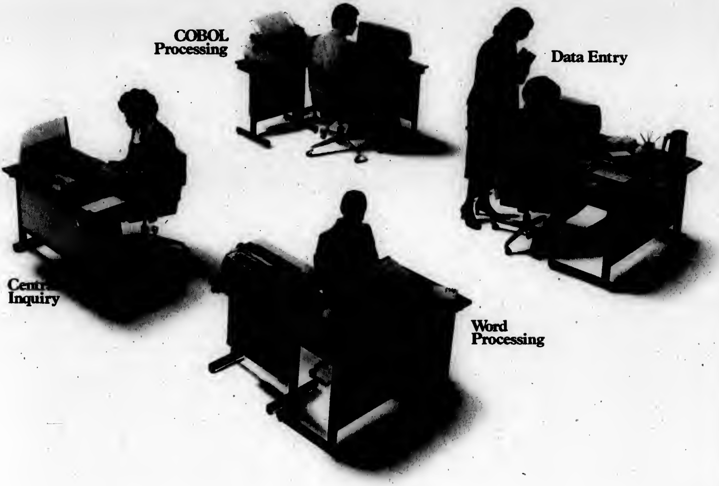

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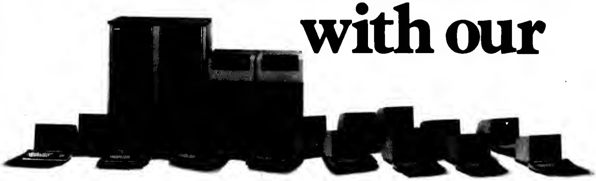

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Datapro Looks at COM Progress

(Continued from Page 49)

card from the file and never have the removal detected," the report continued.

"In the last few years, [yet] another competitor of COM has appeared in the form of the nonimpact printer," the report stated. "These machines offer speed approaching COM speeds, reduced report size and specialized fonts, yet they print on conventional paper." In short, "... they embody many of the advantages which previously were the exclusive province of COM," the report noted.

Users' Comparisons

The Datapro report, besides defining and explaining COM and its various applications, also presents a user comparison chart rating a total of 92 in-house COM units.

Users were asked to rate their COM units on eight characteristics including print quality, throughput, ease of operation, maintenance service, manufacturer's software, reliability and overall satisfaction, Datapro said. A total of 81 respondents evaluated their machines, taking into consideration such things as character-generation technique, on- and off-line usage, film type and graphic and alphanumeric capability, the research firm stated.

Bell & Howell Tops

The information, supplied through a reader survey form and submitted from Aug. 1 to Oct. 31, indicated that users of in-house Bell & Howell Corp. Model 3700 COM recorders were more satisfied with their equipment than users of competitive recorders, the report said. Bell & Howell units were followed by those of Quantor Corp., Eastman Kodak Co., Datagraphix, Inc., 3M Co., Memorex Corp. and NCR Corp.

COM Unprofitable?

Many companies have withdrawn from the field entirely, discovering COM to be an unprofitable ventures, the report observed. Firms that have dropped out include Burroughs Corp., IBM, Sperry Rand Corp., Gould, Inc., Pertec Computer Corp. and the Harris Corp., the survey related.

On the other hand, "industry sources estimated the installed base at year-end 1976 to be 3,180 units, and it was forecast that this base would grow to 8,840 by 1980 and to 15,700 by 1985," Datapro reported.

A comparison list of prices and characteristics of the many COM units is also included as part of the report, which costs $12 from Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

UL Approves Gould Units

CLEVELAND — Gould, Inc. has announced its complete line of electrostatic plotters, printer/plotters and its 5000 series has been safety-approved by Underwriters Laboratories (UL).

The units passed UL Specification 478 for DP equipment and are authorized to carry the UL label.

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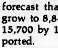

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Pennsylvania User Gets First 5110

By Esther Surden
CW Staff

PUNXSUTAWNEY, Pa. — Price, performance and service — these were the reasons the first user of the IBM 5110 floppy disk-based system gave for his purchase of the recently announced unit.

The user, Punxsutawney Electric Repair Co., is a distributor of electrical products and employs about 19 people. The system will also be used to meet the DP needs of a sister company with 30 employees called B.F.G Electroplating, according to Jeff Grube, vice-president of the repair firm.

Grube had been looking for a small business system for a while before settling on the 5110. "We had a problem finding the right machine," he said recalling the search had as its object a system with sufficient access speed to mass storage and space enough to accommodate the firm's inventory list.

"Everything we found in the past would have been insufficient for the price we would have had to put into it," he added. "We assumed all along that if we would wait, we could get what we wanted."

The user also decided on the 5100 because "we liked IBM's service. We are isolated in a small town and, in investigating systems, we had to make sure we could get service," Grube said. The IBM office is located about an hour's drive away.

Installed in the beginning of February, the system is expected to handle billing, inventory control, accounts receivable and sales analysis applications. "We are doing all our own programming," according to Grube, who took some programming courses in college. Grube also took IBM's one and a half day course in Basic before attempting to program his applications.

The payroll program has been completed and the rest of the accounting applications should be on-line soon, he predicted.

Grube expects the system will not only relieve the company's paperwork load, but will provide benefits in the management reports that will be prepared as a by-product of the processing.

Gains Doubled Workload

User Gets Bigger, Buys Smaller System

By Ann Dooley
CW Staff

DENVER — When First Independent Stock Transfer Agent, Inc. began increasing its share of the market, it decided to decrease the size of its computer system in order to keep up with company growth.

In switching from a large computer system to a minicomputer, the user cut its DP costs almost in half, according to T. Donald Brandes, former president of First Independent. The savings are definitely one of the main benefits of the smaller system, but it also provides greater data availability and greater ease of use, Brandes said.

First Independent previously used an IBM 360/40 through a service bureau and switched to an IBM System/32 in June of 1976. The switch went very smoothly, according to Brandes, who was able to train the existing clerical staff to use the system instead of needing to hire DP personnel.

The members of the staff like the system because it is easy to operate and "they can do their own work instead of waiting for someone else to get around to doing it," he said.

Same Cost, Double Work

In the stock transfer business, it is important to deliver fast service at competitive prices to publicly owned companies which don't necessarily want to get involved maintaining the thousands of shareholder records that need updating and tracking, Brandes said.

First Independent had grown in a very short time from 37 clients and 45,000 shareholder records to more than 60 clients — ranging from oil companies to an ice cream franchise — with 75,000 records. DP costs ran about $27,000 a year under the IBM 360/40.

"Since we've gone to the minicomputer system, our DP expenses are running about the same, but we're doing almost twice as much business," Brandes said.

One reason for the increased efficiency is the use of separate diskettes for each client. "We had massive files to work with, but the diskette can break down the information according to a client file and update it. In order to update a record with the old tape-oriented system, the whole tape had to be run before the change could be made," he explained.

The diskette can be loaded into the system in about eight to 10 minutes, he added.

Plans for System/34

Last year, the company purchased another System/32 for added capacity. Both units have a fixed-disk capacity of 13.7M bytes and 16K memory. The system also includes a 150 line/min printer.

First Independent plans to upgrade to a System/34 next month for even greater capabilities in tracking shareholder records, according to its current president, Terry Kirchner.

In addition to a 27K minicomputer CPU, the $75,000 System/34 will have four data entry spooling devices and a high-speed 300 line/min printer, Kirchner said.

Encryption Module Fits PDP-11

SCOTTSDALE, Ariz. — Encryption data security hardware for Digital Equipment Corp. PDP-11 minicomputers has been added to Motorola Corp.'s Infoguard line of encryption products, which reportedly conforms to the federal Data Encryption Standard (DES) [CW, Jan. 9].

Motorola's Government Electronics Division described the DES1100DSM as a self-contained encryption module that implements the DES within a customized, single-chip NMOS LSI device.

The DES1100DSM features an M6800 microprocessor and is said to operate in cipher feedback or cipher block-chaining modes, handling such tasks as enciphering and deciphering data, encryption key loading and immediate key restoration.

The DES1100DMS costs $1,995 from the Government Electronics Division of Motorola Corp. at 8201 E. McDowell Road, Scottsdale, Ariz. 95252.

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Warehouser Stows Away Inventory Problem

LANSING, Mich. — A small business system at an automobile warehouser here has helped solve the firm's massive inventory inquiry problems, according to the user.

"Before installation of our small business system, we did all of our inventory control and purchasing manually from the usual perpetual inventory cards," according to Stuart Morrison, owner of Mid State Automotive Warehouse, Inc.

"Every sale made and every part received from a manufacturer had to be posted by hand. Our warehouse has an unusual number of phone orders as opposed to written salesman's orders. In those cases, we had to check our cards and let the customer know if we had the items on hand.

"If the customer wanted them, we would pull the parts and deduct them from our on-hand inventory. We were normally very fast in deducting outgoing merchandise, but our people were constantly criss-crossing and getting into each other's way.

"We had difficulty in training new employees because of the need to learn each vendor and card location," Morrison recalled.

"When we wrote an order, it would sometimes require reviewing as many as 2,000 cards for a single vendor. This could take up as much as two days of our buyer's time because of the analysis required and the interruptions.

"We were well aware that the last part of these orders might not be as intelligently written as the first part because of the tediousness of the task," he said.

Breaking the Stranglehold

Once Mid State determined the growth pattern that brought them to a $2 million corporation carrying 75 vendor lines and 25,000 part numbers and serving over 80 jobbers would soon strangle it in paperwork, Morrison decided there was only one way out without a substantial increase in personnel — a computer.

Workstations have eased warehouser's inquiry problems.

Morrison, who admitted he knew nothing about computers when he began his search brought in an outside consultant who looked at the size of the company, inventory, the kinds of reports generated, the people who would be running the system and the methods currently in use.

Although several manufacturers offered systems complete with software specifically for distributors, none of them met his exact requirements, Morrison said. "We started by interviewing about eight companies and developing a game plan as to what we really wanted. If there had been a program available that really met our requirements, we would have bought it. I guess now there is — ours."

Mid State therefore began to base its selection on a system that would accept the kinds of programs it needed and would be easy enough to use that any of its counter salespeople could operate it.

"We looked at the way we did things and decided against a computer that would force a major change," Morrison said. "We knew that the transition from a manual system to a computer would be confusing, and I didn't want to foster even more problems by trying to force new methods down my people's throats."

Another criterion was that the system handle at least three workstations for the counter salespeople that would be tied into the central system for inventory, invoice and shipper updates.

Another key objective for the system was that it be "as quick and accurate as possible in handling our incoming phone orders. Therefore, in developing the system, we required on-line and preinventory capabilities," he noted.

Finally, Morrison said, he wanted a system that could be expanded in the future as Mid State grew.

The system Morrison finally decided upon was a Wang Laboratories, Inc. WCS-30 with three workstations, two printers and a 10M-byte hard disk for on-line storage.

Because Morrison needed custom software, he called in an outside programmer to develop the exact programs he needed. The programmer was able to write all initial programs by the time the system arrived, and all inventory and related information was input in one weekend.

Sales records for each vendor were also input into the system the same weekend for use in management reports.

Backup Skipped

Morrison noted that the one area he did shortcut was running a backup manual system during the initial months of operation. "People told me that we had to run a backup manual system for at least six months," he reported. "We did it for two days and the computer was running so well that we dropped the manual system and went totally to the computer."

The three workstations at Mid State are downstairs, where the customer phones are located and customers come in for pickups. "When a customer phones in an order, the counter-

(Continued on Page 62)

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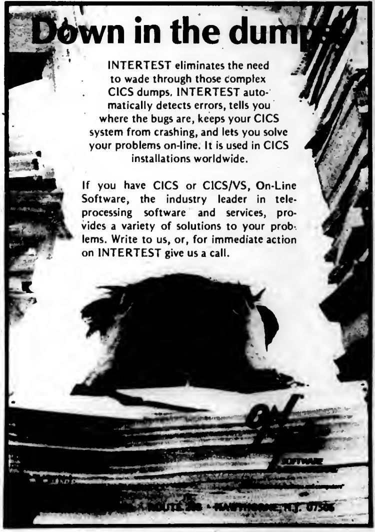

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For Marketing Department

Small System Fills 'Insatiable Demand' for Data

EDISON, N.J. — A small business system at Stendig International's Administrative and Distribution Center is helping that firm satisfy its marketing department's "insatible demands" for information, according to a spokesman.

In developing a system, the contract furniture manufacturer "tried to anticipate all possible questions" the marketing department might ask, according to Dick Kamen, director of finance and administration. "These revolve particularly around who is specifying what type of product."

For example, the marketing development wants to know which architect specified what order. "We want to know if certain styles are falling off or others are moving up: Are new trends under way? Obviously, we want to spot them as soon as possible. You don't turn the production spigot on and off overnight," Kamen pointed out.

The system at Stendig consists of a Data General Corp. CPU with an eight-port multiplexer and 128K memory, two 40 M-byte disk drives, a 300 line/min printer and five CRT terminals. It runs under the Micos operating system from Mini-Computer Systems, Inc.

Bad Experience

Kamen helped choose the system when he was serving as a financial consultant to Stendig. Stendig's previous experience with a computer had been something less than satisfactory — too much had been promised too soon and too little was delivered too late at too large a cost, he said.

In making a fresh start, Kamen took cursory looks at about 300 systems and made very close examinations of about four dozen, most of the latter minicomputer-based.

The search resulted in recommendation of the Micos operating system, with customer applications design by Innovative Equipment, Ltd., a turnkey systems firm.

The system developed by Innovative Equipment to Kamen's specifications services all basic accounting and management information functions including order entry, inventory control, accounts payable, accounts receivable, invoicing, bill of materials, sales analysis, general ledger and multistate payroll.

Since the system can be used by people without DP experience, Stendig was able to meet its goal of reducing DP costs. Within several months after the system was installed, Stendig had begun to cut costs which were expected upon completion to reach a $70,000/year. To a company with sales under $10 million, such a reduction is not insignificant.

Stendig produces and imports a comprehensive line of furniture sold under the Stendig and B&B America labels. The primary buying influence are architects and designers specifying office, public area or residential furniture on behalf of corporate or institutional clients.

The line is rather eclectic, covering such classics as the bentwood rocker and the tubular office chari, elegantly overstuffed sofas and such offbeat items as a sofa in the shape of lips and another shaped like a baseball glove.

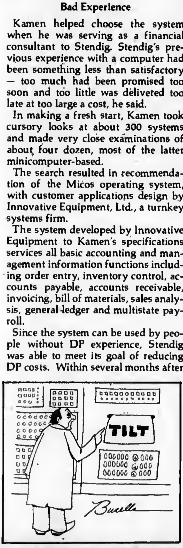
When the product line has such physical bulk, warehouse usage can be a significant cost factor. Every effort is made to get goods in and out of the attached warehouse as rapidly as possible, Kamen said.

It's also vital to keep up-to-the-moment on costs, especially for foreign goods, he noted, so the inventory control system includes landed costs and adjustments for fluctuations of the foreign exchange money market.

When multiplied by such variables as configuration, fabric color, the fairly long list of inventory items moves toward the astronomical. With the professionals who serve as the main buyers, typically individuals who know what they want — and when they want it — tracking inventory and the status of an order is a complex affair.

Kamen feels the minicomputer system is equal to the job. In fact, he said, a person in Customer Service sitting at a CRT terminal often displays the entire order status so rapidly he can anticipate just what the caller is going to ask.

A 1,200 bit/sec modem connects Stendig in New Jersey with the Innovative Equipment office in New York so program modifications, updates and maintenance can often be done online.



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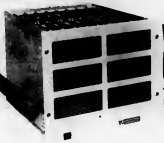

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3	MJ11-BG 256K word (512KB) additional	53,240	159,720	8	128K x 18 (256KB) additional	5,140	41,120
Source: Datapro, February '77			$215,220				$ 44,520

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Custom Furniture Manufacturer

System Helps Firm Keep Up With Competitors

CLEVELAND – When a company is just starting up in a competitive marketplace, sometimes the difference between success and failure can rest on how well its customers are served.

In the case of Professional Housewares Distributors, Inc., (PHD) a small business system is reportedly helping the firm provide the level of customer service required to allow it to keep up with the competition.

"Most distributors "start out with a system designed to meet their internal needs and then expand it to provide DP services to their customers," according to Richard F. Henry, controller. "Because we would compete against some very tough, long-entrenched distributors, the first requirement of our system had to be its ability to provide a full range of services and reports for our customers."

Henry drew up a list of 30 separate criteria by which to evaluate available systems. He then invited 10 different computer manufacturers to submit proposals for PHD's system.

Among the requirements were a two-month delivery date, programming in Cobol and RPG-II, extensive on-line capabilities, ease of operation, low cost, easy growth path and applications program support.

Several manufacturers declined to submit proposals, Henry recalled. Of the ones that did, about half were eliminated because they failed to meet one or more major requirements.

After several weeks of evaluating the remaining proposals, PHD ordered a Datashare system from Datapoint Corp. PHD's system is based on a Datapoint 6600 with 120K bytes of user memory.

"Most traditional computer systems are batch or sequential processing-oriented," Henry emphasized. "On-line capabilities have been added only as an afterthought to meet customer demands for interactive capabilities.

"Our system was designed primarily as an on-line interactive system with batch processing taking second place in importance. Therefore, it has enabled us to develop applications with a minimal amount of technical expertise and programming experience," he said.

Using programs executing on Datapoint 3600 CRTs, clerks enter each order by following the instructions and formats displayed on the screens. From preprinted order forms sent in by salesmen or customers, a clerk uses the workstation's keyboard to enter customer's number, purchase order number, shipping data, advertising data, type of order, saleman's number, identification numbers of each item, quantity ordered and any special instructions relating to changes in retail prices stemming from customer promotions.

Already stored in the system's data base is information on PHD's approximately 3,000 electrical appliances, housewares, cleaning items and other household products, plus detailed information on each of the firm's more than 400 stores and shipping points.

As each order is entered, the system assigns a work-order number to identify and correlate actions and documents relating to the process of filling that order. At the same time, additional information from the system's customer and product files is added to the order file.

At the end of each day, the system prints out detailed warehouse picking lists for each order.

Pricing Task

The system also calculates retail price information. The customer's margin percentage for each item, his requested roundings of prices and his treatment of multiple-item prices are all computed by RPG-II programs.

For most of its customers, PHD also applies price tickets to each item before shipment. These price tickets, which contain any information relating to the departments and product classes that the customer desires, are also printed out at the end of each day and fotwarded to the warehouse along with the picking list.

Once an order has been assembled, a copy of the picking list, noting any partial shipments, is returned to PHD's computer center for the preparation of invoices and bills of lading.

The system also produces detailed invoices and bills of lading on its 600 line/min printer.

PHD's invoices contain management information. This data includes gross profit margins for each item ordered plus total margins for each order by department, order and product class.

If promotional discounts have been in effect for any items on any order, the Datapoint system then identifies such items on the invoice so the customer can assess the effect of the promotion on his volume and margins.

The most time-consuming batch processing task performed by the system is the printing of customer order books. The books contain listings of all the PHD items customarily ordered by each store and are arranged according to the way the different stores stock these products.

Customer purchase analysis reports are also performed in batch. Each report contains a summary and analysis broken down by item, department and class of the customer's purchases during the period covered.

These reports also include the cost of each item, the customer's retail price and his gross profit margins for each item and for each bookkeeping category.

Warehouser Cuts Inquiry Problem

(Continued from Page 60)

person inputs the part number into the system. Complete information appears on the screen, giving us inventory on-hand, merchandise on back order, descriptions, supersessions, interchanges, etc.

"If we stock duplicating part numbers from more than one manufacturer, the counterperson is instructed to intput a vendor code. After each part number is input, the counterperson may elect to ship, cancel or change the line order quantity.

"If the order is placed, the customer identification number must then be entered. At this point the customer's name is displayed for verification and the counterperson's initials are input. Immediately, the inventory file is updated, and a shipper is printed," Morrison explained.

"An important by-product we have gained is a record of lost sales. We always knew that we lost some sales on both the numbers we normally carried and on those not stocked, but we never had any concrete information as to how much was involved.

"We now get a stocking lost sales report, giving us each lost sale of a stock item as well as a recap in dollars by vendor. For numbers ordered that we don't stock, a report is available by part number and vendor only, but no dollar amount.

"We have begun an extensive program of evaluating these reports and adjusting our inventories," Morrison said.

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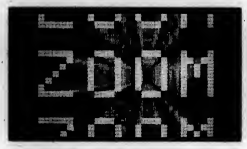

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Business System Cures Hospital's Data Blues

HORGEN, Switzerland, — Expanding facilities and a corresponding increase in the demand for timely medical information forced the administration of a small hospital here to abandon its "almost historical" accounting machine and turn to a minicomputer.

For years, the administration department of Horgen Hospital relied on a 25-year-old NCR mechanical accounting machine to perform business tasks, according to Bruno Zuber, administrative director.

While the primary service at the 100-bed hospital is providing medical care, Horgen, like other businesses, must also pay wages and salaries to a large number of employees in diverse jobs. The hospital must also manage its pharmacy, purchase and manage an inventory of medical and other supplies, bill patients and control its finances.

Several years ago, the institution's management began to consider how some of the administrative functions could be done more efficiently and at a lower cost. But it was not until 1975 that Horgen began looking for alternatives to its accounting machine.

In that year the hospital treated 1,727 patients, employed 152 people and recorded an average bed occupancy of 76.6%.

In contrast, the administration department consisted of five employees. Moreover, the burden on administrative personnel had been increased in recent years by the need to supply a growing amount of statistical information required by the Association of Swiss Hospitals.

Then in 1975 the hospital was told it would in the future also be responsible for running a convalescent home with 100 beds for long-term patients. The twofold increase in bed capacity and a 150-employee increase forced Horgen into an evaluation of newer technology.

From April 1975 to the following September, a DP consultant for Horgen conducted a preevaluation of three minicomputer systems: a Data General Corp. Nova 3, a Hewlett-Packard Co. system and a Digital Equipment Corp. mini. Horgen selected the DG 3/12 because it could be upgraded in the future to handle a larger processing load.

For Horgen, getting a mini that could be easily upgraded seemed the only way to go because the hospital intended to initiate its entry into DP with relatively simple applications and then gradually add on more complex ones, Zuber said.

The 64K-word CPU with a 10M-byte disk, one CRT terminal and a matrix teleprinter were delivered to the hospital in the spring of 1976. Horgen initiated its first application the following July.

"In a hospital, wages and salary accounting, with all their attendant complications — pension and insurance contributions, overtime calculations — are particularly complex and time-consuming because of the irregular working hours," Zuber said.

"In the past, with our old account sheets and our almost historical machine, we needed several days for this work. Now the mini does the job in less than a day, and we have 250 employees," Zuber said.

In addition, the statistics required for the Association of Swiss Hospitals "and also for our annual report — data on types of illnesses, operations, outpatient treatment, laboratory work, deaths — are now available as a by-product, so to speak, of our invoicing procedure," he said.

"Since the beginning of this year, the mini has also been utilized for all our financial accounting and administration," he said.

Red Cross Unit Helps Refugees

GENEVA — A small business system used by the International Committee of the Red Cross at its headquarters here is playing a role in helping refugees emigrate to new countries.

Frequently, victims of political or military upheaval are forced to leave their homes with no passports or identity papers. Red Cross travel documents make it easier for refugees to emigrate to the country of their choice, according to a spokesman.

However, the preparation and monitoring of use requires a special indexing system that has details such as nationality, occupation, accompanying relatives and destination.

By compiling these details and making them available on CRTs, administrative matters are reportedly simplified, thus making the process of emigration somewhat easier for refugees.

The NCR Corp. 8200 small business system used by the Red Cross includes a 128K processor, four disk units, four CRT terminals and two printers.

In addition to handling information required for Red Cross travel documents, the system is also used for budgetary accounting. The accounting system is designed to meet three principal business processing needs.

The first involves normal operations of the 220-person permanent Red Cross staff. The second requirement is to track revenues and expenses connected with activities lasting more than one year.

The largest part of the budget, and the most demanding information-handling task, deals with the extraordinary budget — those projects stemming from disasters and conflicts.

How to avoid having the source of your data become the source of your problems.

A Special Report on Source Data Entry in our April 24th issue.

The trend in data collection is to get closer and closer to the data's source — with devices like OCR and Point-of-Sale systems. Which can be the source of lots of new problems for the user. What may be good for counting hamburger sales in a fast-food franchise, may be quite unsuited to a grocery store or egg wholesale business. And a system that's perfect for a big bank with many branches, may be useless at a medium-sized savings and loan.

In our April 24th supplement, edited by Frank Vaughan, we'll take a look at what it takes to get the data collection job done, accurately and efficiently, in a variety of different situations. Through a series of applications stories, we'll look at how others have solved their unique data collection problems, and give you an idea of some of the things you should do — as well as some of the things you shouldn't. The report will include:

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If you'd like to advertise, the closing date is April 7th, and more information is available from your *Computerworld* sales representative. Or call Terry Williams at (617) 965-5800.

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Firm Paves Way for Improved Throughput

WICHITA, KAN. — A local paving company may be on the right DP road since it upgraded to a system that is providing it with greater on-line inquiry capability and better throughput, according to a spokesman.

Ritchie Paving, Inc. here employes some 550 workers and grosses about $20 million yearly, controller Leon Prior noted. The firm is involved in three major business areas — construction, real-estate management/development and retail sales. Not only does the firm operate ready-mix and dump trucks, but it markets ready-mix sand and concrete, handles building materials related to concrete construction and manages a shopping center/office park.

Controlling all of its business operations is a challenge that is met by the use of a small business system. A few years ago, the company did all of its processing manually, keeping a different sheet for each job. The company then moved to a tab system, which was more efficient but still cumbersome, Prior said.

In October 1973, the firm went to a Honeywell Information Systems, Inc. Model 105 for its payroll, job costing and accounts payable applications. More recently, the firm upgraded to the Level 62.

Ritchie decided to upgrade because it anticipated getting involved in communications-type activities, trying to use terminals for different purposes within the company, according to Prior. Some of the anticipated applications included delivery ticket preparation, truck scheduling and extensive job costing. In the property management area, the company hoped to use the system to check on apartment availability and rental payments.

Looked at Others

"Because we were going to get involved in communicaitons applications, we felt it was not feasible to try to stay with the 105," Prior said. "We did look briefly at the possibility of getting another manufacturer's gear to do this," but the firm's satisfaction with HIS hardware and service, combined with a thorough examination of the systems available when it first chose HIS, convinced the company to stay with that vendor, he noted. Prior added that he had kept up to date on systems available throughout the years.

The system was programmed by the firm's own DP staff, although some free-lance programmers have been used on occasion. "There was quite a lot of work involved in converting from the 105 to the 62, "but the bulk of that work was performed by HIS personnel as part of the contract arrangement, he said.

The system performs check-writing, invoicing, general ledger, job costing, fuel reporting and budgeting applications. Soon to be put on the system is a truck-scheduling application, part of an order-entry system.

"We are working on being able to prepare delivery tickets for the ready-mix operation," Prior explained. This application will involve initial input of information relating to the order such as pricing and estimated delivery times. The first part of this application will print tickets; the subsequent phase will be more involved in scheduling, he said.

"In a lot of areas such as job costing and billing, we have cut DP time either because of the way we've been able to handle files with more file storage or faster speed or the capability to run multiple activities," Prior noted. The firm can do more work within the same number of hours, he said.

Ritchie presently has four CRTs, which are used for program development as well as a bid development application in the ready-mix area. The bidders "can input information relating to the number of years, delivery times, type of mix and other factors and calculate what the cost and bid should be.

"The biggest gain we've made by going to the Level 62 from the 105 has been our ability to add applications that we couldn't run previously," Prior noted, adding that Ritchie expects on-line inquiry to help the firm quite a bit.

Data Printer Unveils 600 Line/Min Model

CAMBRIDGE, Mass. — Data Printer Corp. has introduced a 600 line/min printer that is plug-compatible with the rest of its line.

Including several features often optional on printers, the 1260 is microprocessor-controlled and uses printing techniques of the firm's Chaintrain series. Enhanced upper and lower tractor positioning, a noise-reducing cabinet and self-test capability forms are packaged with the printer.

A 64-character, 600 line/min printer including all features costs $10,720 from the firm at 600 Memorial Drive, Cambridge, Mass. 02139.

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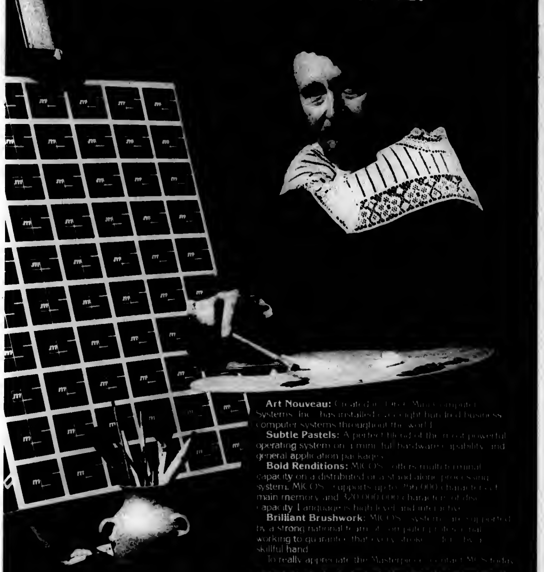

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Second Faire Sees Busy Buying, Selling

By Frank Vaughan
CW Staff

SAN JOSE, Calif. — Both computer hobbyists and heavy rains poured into this city for the recent Second West Coast Computer Faire. The Faire drew 14,140 attendees over its three days and featured 150 exhibits that ranged over the gamut of microcomputer applications.

Robots, ray guns, books, business systems, video games, T-shirts, boards and chips were present at the Faire, where checkbooks and credit cards could be seen flashing at most of the selling booths. In the Faire's carnival-like atmosphere, the most popular exhibits were those where entire systems were "up and running." "Star Trek" remained the king of the microcomputer games.

Following the trends established at previous shows, Heath Co., Radio Shack Co., Imsai and Commodore (who won the "tallest booth award") were the heaviest draws, with Apple Computers, Inc. (second tallest and most colorful booth) joining the regulars with packed booths.

One of the most unusual sights of the show, observers agreed, was IBM's exhibit of its 5110, underlining the trend of having shows cater more to the small business and less to the hobbyist. The computing giant's presence at the show did little to quell the spirits of the other vendors, who were too busy selling systems to worry about the giant from Armonk.

Special CW Photo Feature on the Second West Cost Computer Faire follows on Pages 68 and 69.

The show was, however, rife with rumors that IBM is planning to open a chain of retail stores. The number of stores ranged from 18 to 80, depending upon the rumor, with most people leaning toward the 28 figure. The rumors have since been clarified [CW, March 13].

Magazine Booths

On other fronts, all of the major hobbyist magazines were present. *Byte* had its usual dignified, blue-carpeted booth, while Bob Jones's *Interface Age* booth was the scene of many secret-looking huddles.

Wayne Green's *Kilobaud* booth did a brisk sales in magazines, while apronned Dave Ahl and his *Creative Computing* crew gave their booth the appearance of a country store.

Visitors to *ROM* magazine's booth had a chance to buy one of the Martha Herman computer T-shirts, along with a rare chance to see a photograph of the *ROM* staff atop a huge snowbank that was taken during the recent Northeast blizzard. Few of the Californians who glimpsed the photo continued to complain about the rains that fell during the Faire.

In one of the more interesting battles that occurred during the Faire, Dr. Adam Osborne of Osborne Associates and Rodnay Zaks of Sybex, Inc. — former associates and now competitors — found themselves with booths facing each other near one of the entrances. Both exhibitors did a brisk business in books that deal with higher technology subjects. Zaks took advantage of the show to introduce his latest book, *Microprocessor Lexicon*, a pocket-sized book of acronyms and definitions that sells for $2.95.

Market Direction

Many of the exhibits showed vendors are hoping to get away from "hobbyist-only" reputations and get into the "small business" system business. This Faire had more exhibits directly aimed at the small business than any show during the 1977 season.

Most of the vendors were extremely pleased with the Friday turnout, which contained a high percentage of businesspeople, and a few confided that there is very little future in the "Star Trek'-playing hobbyist" market.

Yet the component dealers such as Artec Electronics, Inc. Jade Computer Products, S.D. Sales Co., Technical Design Labs and Zilog, Inc. reported strong sales throughout the Faire. S.D. Sales reported higher first day sales here than total sales at almost any of the 1977 shows.

Despite the claims of another show sponsor who called the Faire "an overgrown meeting of the Homebrew Computer Club," most classified it a tremendous success. Or, as a gas station owner who turned most of his station into a parking lot said as he pocketed one attendee's $2, "I never thought much of computers before, but I like the hell out of them now."

Micro Bytes

Cassette Tapes Offered

SUNNYVALE, Calif. — Microsette Co. here has introduced a line of cassette data tapes for home and hobby computer users. The cassettes are digital quality and come in lengths of 50-, 100-, 200- and 300 feet, according to the firm.

There are four tapes of one length per package, and each cassette comes with a hard box and two extra sets of labels.

Prices for each of the tapes are 60 cents, 70 cents, 85 cents and $1, respectively, from Microsette at 777 Palomar Ave., Sunnyvale, Calif. 94086.

Program Reads Time-Coded Tapes

CHICAGO — Written in 8080 Assembler, a program designed to read and index time-coded films and tapes has been developed here by J.S. Weiner.

Based upon the Society of Motion Picture and Television Engineers Time Code Standards, the program resides in 3K of contiguous memory, requires two parallel input ports and will operate with most CRT modules having an on-board screen memory, the developer said.

Supplied on paper tape along with a manual and a source listing, the software costs $49, which includes a presoldered, tested interface module, Weiner noted from 4440 N. Kedzie Ave., Chicago, Ill. 60625.

Module Provides 6800 Links

LAFAYETTE, Ind. — Wintek Corp. has developed an analog module that reportedly permits the 6800 microprocessor to be interfaced with servos, motors and transducers.

The Wince Analog Interface options include a 16-channel multiplexer, an 8-, 10- or 12-bit analog-to-digital converter and an 8-bit digital-to-analog converter, the firm said.

The module is available on the standard 4.5-by 6.5-in. 44-pin board. It costs $99 from the firm at 902 N. 9th St., Lafayette, Inc. 47904.

Heath Catalog Free

BENTON HARBOR, Mich. — Heath Co. has announced the availability of the 1978 winter edition of its catalog, which lists more than 400 electronic kits and products.

The 104-page catalog includes Heath's line of personal computing systems, electronic test equipment, television receivers and electronic self-instruction courses covering digital techniques, microprocessors and programming in Basic, a spokesman said.

The free publication can be obtained by writing to the Heath Co., Department 350-530, Benton Harbor, Mich. 49022.

Motorola Dot Matrix Printers Built For Development Systems

PHOENIX — Motorola Semiconductor Products, Inc. has announced a line of dot matrix printers that are compatible with its microcomputer development systems, including the Exorcisor and Exorterm 100 and 200 models.

The Model 779 is capable of printing 80 to 132 columns in a 5 by 7 dot matrix at a rate ranging from 21- to 90 line/min and 60 char./sec, according to a spokesman. The Model 781, an 80-column character printer, features a bidirectional, logic-seeking movement of the print head enabling throughput of up to 120 line/min, he added.

The Model 702 is similar to the 781 except that it has 132-character print columns and can attain a throughput speed of 45- to 185 line/min, the firm noted. The Model 703 has a head speed of 180 char./sec and can provide a throughput rate of 70- to 280 line/min.

All printers except the Model 779 have a tractor feed with a paper-out sensor and use standard computer paper, the spokesman said. The Model 779 has a pinch roll feed and uses teletypewriter roll paper.

Motorola Model 779

The Models 779 and 781 are priced at $1,495 and $2,095, respectively, while the 702 and 703 cost $2,500 and $3,125, the firm stated from P.O. Box 20912, Phoenix, Ariz. 85036.

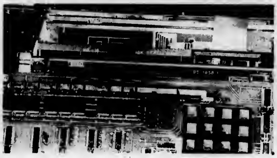
Extensys Adds Glitch Grabber

MOUNTAIN VIEW, Calif. — The Extensys Corp. has a printed circuit edge-connective device that is said to reduce noise, glitches and jitter on the S-100 microcomputer bus.

The Glitch Grabber was designed to plug into any open slot on the S-100 bus. It features a self-regulating transistor network that controls voltages and modifies circuitry to handle more or less voltage, a spokesman noted.

Circuitry of the device is activated only in the presence of a glitch, so the unit does not load the S-100 bus signals, the firm stated.

The Glitch Grabber is priced at $79.50 from the Extensys Corp., 380 Bernardo Ave., Mountain View, Calif. 94040.



From the basics of a children's board game (Creative Computing's "Computer Rage," above) to the complexities of microcomputer circuitry (Heath's H8, left), the Faire had exhibits of interest to most age groups.

The age-old chessboard fit in well with the technology of microcomputers as programmers pitted their skills in popular battles with opposing strategists.

From Ray Guns To Micro Mice . . .

And the micro-cat was even larger . . .

The Faire gave visitors an opportunity to get some hands-on experience with prospective purchases as well as a chance to see some of the latest products in the micro field.

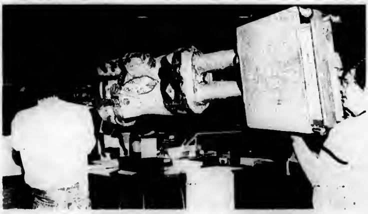
A behind-the-scenes peek at Commodore's 'Pet Store' showed how six Pets were hooked up. Commodore had one of the largest booths at the show, with Pets available for hands-on use by prospective buyers and game players alike.

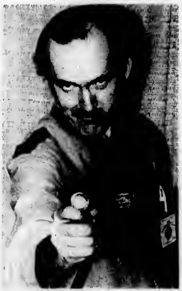
The purpose of any hobby is to have fun and this youngster, caught unaware by the camera, showed that children and microcomputers get along very well. At many exhibits, serious buyers had to battle their way past hoards of younger people to get their hands on the equipment.

At the Second West Coast Computer Faire

Have you ever wondered where a conference chairman goes after introducing a speaker? Stephanie Buckholz helps Faire Chairman Jim Warren unwind.

A CW Photo Feature
By Frank Vaughan





Visually, the Faire was something to behold as exhibitors went to great lengths to catch visitors' eyes. A wooden Indian (left) and a 'cosmic ray gun' (right) were just a few of the ways in which exhibitors tried to lure buyers.

Has 64K RAM Capacity

Infinite MPU Available Five Ways

MELBOURNE, Fla. — Infinite, Inc. is offering an 8080-based microcomputer system it said employs the S-100 bus structure and is capable of housing up to 64K of random-access memory (RAM).

The UC2000 is available in five configurations ranging from a basic system containing an eight-slot mainframe, power supply, CRT keyboard and cabinet to a system consisting of an MPU, video interface, 16K RAM, extended keyboard, RS-232 printer interface and a separate dual floppy disk drive, according to a spokesman.

The processor has a 78-instruction capability with 244 variations, 10 registers and an eight-level vectored interrupts, he added.

The unit also has a bus output driving capability of 30 TTL loads and a 1K-byte read-only memory monitor expandable to 3K bytes. The processor was designed to function during direct memory access cycles as well as multiple processor operation, the firm pointed out.

The video portion of the UC2000 uses a 7 by 9 upper and lower case alphanumeric character font, a 96-character Ascii set, 32 special characters and a 64-character by 16-line display; it features a graphics capability, the spokesman said.

Options include a current-loop serial interface, a cassette tape interface, larger keyboards and internally mounted floppy disk drives.

The price of the basic system with 8K RAM, CRT and cassette interface, power supply, CRT monitor, keyboard and cabinet is $2,266. Infinite is located at 1924 Waverly Place, Melbourne, Fla. 32901.

"Look for our MICROCOMPUTING CLASSIFIED EXCHANGE in the classified pages."

Mailing Package Fits North Star

BROOKLYN, N.Y. — HSC Computer Services, Ltd. has developed a Mailing Label and Directory Lookup package for users of North Star Computer, Inc.'s disk operating systems.

The package, written in North Star Basic, allows the entry on each diskette of up to 480 records containing names, addresses and telephone numbers, the listing of all records on a file and the lookup of each name within a file with the retrieval of address and telephone numbers, a spokesman said.

Labels Printed

Also permitted is the printing of mailing labels in any region specified by the user, he added.

The package, contained on a diskette, sells for $50 with documentation. A listing of North Star error messages and their meanings is also available for an additional $5 from the firm at P.O. Box 43, Brooklyn, N.Y. 11236.

Controller Acts As DP Teacher

LOS ANGELES — Energy Electronic Products Corp. (EEP) has introduced a controller built around a Panasonic Corp. 4-bit microprocessor and designed to teach the basic concepts of computer technology.

The KX-33B includes 1K by 8 bits of read-only memory (ROM) for the system program and 64 words by 4 bits of random-access memory (RAM) for keyboard storage, according to a spokesman.

The unit also has two static RAM chips with 256 words of 4 bits each, an 8-bit latch, audio amplifier multivibrator integrated circuits and a speaker.

The KX-33B also has a cadmium-sulfide light-sensitive photocell, a moisture transducer and a reed switch, the spokesman noted.

The unit is priced at $229 from EEP, 6060 Manchester Ave, Los Angeles, Calif. 90045.

Panasonic 4-bit microprocessor teaches basic DP concepts.

N

NODE — A terminal of any branch of a network or a terminal common to two or more branches. Also called junction point, branch point, vertex or nodal point.

NONARITHMETIC SHIFT — Refers to a shift in which the digits dropped off at one end of a word are returned at the other in a circular fashion, i.e., if a register holds eight digits, 23456789, the result of a cyclic shift two columns to the left would be to change the contents of the register to 45678923. Synonymous with end-around shift, ring shift and cyclic shift.

NON-RETURN-TO-ZERO (NRZ) — 1. A method of writing information on a magnetic surface in which the current through the write-head winding does not return to zero after the write pulse. 2. A mode of recording in which each state of the medium corresponds to one binary state. In the mode, the state of the recording medium changes when the information changes from 1 to 0 or from 0 to 1. Note: NRZ modified is also often called NRZI.

NO OP — Refers to an instruction commanding the computer to do nothing except to proceed to the next instruction in sequence.

NUMBER SYSTEM — The following are names of the number systems with bases 2 through 20; 2, binary; 3 ternary; 4, quarternary; 5, quinary; 6, senary; 7, septenary; octal or octonary; 9, novenary; 10, decimal; 11, undecimal; 12, duodecimal; 13, terdenary; 14, quaterdenary; 15, quindenary; 16, sexadecimal or hexadecimal; 17, septendecimal; 18, octodenary; 19, novemdenary; 20, vicendary. Also 32, duosexadecimal or duotricinary and 60, sexagenary. The binary, octal, decimal and sexadecimal systems are widely used in computers.

O

OBJECT CODE — The basic program; the output from a compiler or assembler which is itself executable machine code or is suitable for processing to produce executable machine code.

OCR (OPERATING CHARACTER RECOGNITION) — Refers to recognition by machines of printed or written characters based on inputs from photoelectric transducers.

OFF-LINE — Refers to equipment or devices not under direct control of the central processing unit. Also concerns terminal equipment not connected to a transmission line.

ON-LINE — Relates to equipment, devices or systems in direct interactive communication with the central processing unit. May also be used to describe terminal equipment connected to a transmission line.

From Microcomputer Dictionary & Guide by C. J. Sippl and D. A. Kidd. Used with permission of Matrix Publishers Inc. 207 Kenyon Road, Champagne, Ill. 61820

COMPUTERWORLD

CI Notes

HIS Cancels Its 66/85, Continues CML Work

WALTHAM, Mass. — Honeywell Information Systems, Inc. will not market its Model 66/85 computer announced a year ago, apparently because of difficulties in development of Current Mode Logic (CML) technology.

Troubles in the firm's large-computer operation have been rumored for some time, particularly with the 77/85, whose delivery schedules have slipped several times.

The firm announced it would continue to develop CML technology and Stephen G. Jerrits, group vice-president, said "problems associated with CML and micropackaging technology have been solved."

In spite of that, however, he said the firm had decided to withdraw the 66/85 because "there are other, more cost-effective approaches to meeting the needs of our large-scale users in the near future."

Dataproducts Creates Network Of Independent Distributors

WOODLAND HILLS, Calif. — Dataproducts Corp. has announced it will establish an independent distributor network within its North American sales organization to sell printers to new markets.

To set up and direct this network, Dataproducts has named Lawrence E. Bowne to the new position of director of distributor sales.

Clarifications

Portions of two recent *Computerworld* stories deserve clarification.

First, an unfortunate juxtaposition of paragraphs in a report on John Imlay's remarks to the U.S. Senate Committee on Small Business might leave the impression that Management Science America, Inc. is facing possible bankruptcy [CW, Feb. 27]. This is not true. In fact, the firm is doing extremely well.

Second, Carl Jeremias, marketing vice-president at Basic/Four Corp., predicted that the small business computer market will grow at a rate of between 25% and 40% and that the firm will double its business in the next three years, rather than the 35% to 40% and 10 years quoted [CW, March 6]. The firm originally provided the incorrect numbers.

On Capitol Hill

Procurement System Set, Library Service Brewing

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. — The Office of Management and Budget (OMB) recently announced that it will establish a central computerized system to keep track of federal contracts — contracts that command about $80 billion in taxpayer monies each year.

At about the same time, the Library of Congress stated its intention to open some of its on-line files to selected federal agency libraries and to national libraries and library network centers.

The library in the Executive Office of the President, of which OMB is a part, along with the libraries of the Central Intelligence Agency (CIA) and those of the Departments of Commerce and the Interior have been chosen to initiate the Library of Congress's pilot project.

Observers close to the OMB effort to design a uniform procurement system hope the operation will mature from a batch to an on-line mode and that one day, terminals in the Library of Congress will have direct access to the federal procurement data computer.

The information exchange inside and outside of government is on.

"Incredible as it may sound, there is no one today who can identify everything that Uncle Sam is buying and from whom, or whether the dozens of agencies that let procurement contracts are getting adequate competitive bidding," Acting OMB Director James T. McIntyre said at the announcement of the procurement data system.

The Department of Defense (DOD), which accounts for 70% of the contracting done by the federal government, already has its own procurement data system in place and so has been chosen to establish and operate a similar system for as many as 80 civilian agencies, according to William J. Maraist, Deputy Assistant Administrator for Regulations in OMB's Office of Federal Procurement Policy.

DOD relies on tne Air Force Data Services Center and Honeywell Information Systems, Inc. series 600 equipment to run its own procurement data base, which is maintained by the Office of the Secretary of Defense, Joseph G. Cannata, director of the new Federal Procurement Data Center, explained. This equipment can't accommodate procurement data from the additional federal agencies, however, and the Air Force's resources can't be augmented, he added.

Cannata believes that either an outside remote-batch or time-sharing contractor or a minicomputer will have to be selected to do the job. DOD is footing the bill for creating and maintaining the system on civilian pro curement data.

Come October, the system is to be up and operating and open to the public as well as government officials seeking to understand

(Continued on Page 72)

Exhibit Space Open For Personal DP At Anaheim NCC

MONTVALE, N.J. — Exhibit space is available for the 1978 National Computer Conference (NCC) Personal Computing Festival to be held June 6-8 in Anaheim, Calif., the American Federation of Information Processing Societies (Afips) has announced.

Reservations are being accepted from manufacturers and suppliers whose products and services ate in the field of home/hobby personal computing, Afips said, noting that about 25,000 people attended the personal computing exhibition at last year's NCC in Dallas.

Afips predicted that attendance record will be broken this year since Southern California is more saturated with persons who produce, build, buy and use personal computers for business needs or personal enjoyment.

The festival will include more than 150 booths displaying such products as components, terminals, software, publications, kits, hobby items and disk and tape.

Each 10- by 10-foot booth is available for $600; tabletop displays are priced at $200; and packaged booth displays are available.

Additional information can be obtained by contacting Marie Stewart, NCC '78 Personal Computing Festival Exhibition, 210 Summit Ave., Montvale, N.J. 07645.

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Procurement System, Library Service Near

(Continued from Page 71)

how much is being spent for what.

The Office of Federal Procurement Policy and a policy advisory board consisting of representatives from several major federal departments and agencies will run the procurement data system and make any changes to it, Maraist said.

Government Benefits

The system should provide potential contractors with essential information concerning the federal market place—how and where to offer products and services. More competition and potentially lower prices for federal purchasers are hoped-for government benefits of having data all in one place and stored and retrieved in a uniform manner, Maraist stated.

Not only could contract awards be traced by producer and location without going to any of the between 3,000 and 5,000 contract offices in the federal govenrment, but the system will help the Office of Federal Procurement Policy in its efforts to reform existing contracting procedures, he added.

The Federal Procurement Data System and Center represent the culmination of work begun in the fall of 1974 when Congress directed the executive branch to establish such a system. The library has considered its plan for less time — over the past two years — and has ventured forth to find users beyond Capitol Hill without congressional approval.

'Logical' Library Extention

What the library considered merely "a logical extension of its on-line bibliographical services and catalog distribution system" and a library decision has raised the eyebrows and the ire of some members of Congress.

Others, in particular Neal Gregory, staff director for the House Administration Committee's Policy Group on Information and Computers, and John Swearingen, who heads the Technical Services Staff of the Senate Rules Committee, are concerned over the degradation of the library's services to Congess. They are thinking of the response time now received on Capitol Hill terminals.

At the same time, Gregory and Swearingen feel the library's vast fund of information should be made available to the federal agencies and other libraries.

William R. Nugent, head of the library's information systems office, does not believe service to Congress will suffer.

Beginning in March, the library will open some of the files in its Subject — Content Oriented-Retriever for Processing Information On-Line (Scorpio) and Multiple Use Marc (MUMS) systems to dial-up access by 35 full-time "equivalent" terminals located in a variety of institutions.

Scorpio contains files involving the library's reference activities, and Mums is oriented toward technical processing. These systems will be accessed by 92 full-time equivalent terminals in library network centers and large research libraries, 10 in federal libraries and agencies and five in state libraries and agencies, Nugent said. He defined a "full-time equivalent terminal" as handling 60 transactions per hour — a transaction being one round trip from the terminal to the computer and back.

Access for Outside Users

Outside users will access the library's Amdahl Corp. 470V/6, its teleprocessing CPU, just as Capitol Hill users do, Nugent stated. But unlike congressional users, outside libraries and federal agencies will have their access controlled in a manner similar to a telephone exchange, he explained.

Outside users "will share a fixed-diameter pipeline, if you will" Nugent said. Service may be degraded, but it will only be that service to these additional users. Degradation would show up in local queues to use the system and busy signals.

The library will charge 16 cents per transaction for access to its files — an average of $9.60 per connect hour.

Apple Obtains Equity Funding

SAN JOSE, Calif. — Apple Computer, Inc. announced at the West Coast Computer Faire here that it has obtained equity funding from Venrock Associates, Capital Management, Inc. and Arthur Rock.

The firm's initial financing was provided by the Bank of America and by individuals within the company, a spokesman said.

"The proceeds will be added to our working capital and used to increase the company's production, new product development and worldwide marketing programs," according to A.C. Markkula, Apple's board chairman.

Apple Computer, Inc. has been in the personal computing business since January 1976 and has been shipping the Apple computer since May 1977.

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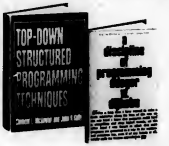
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FCC Will Deregulate Terminal Gear: Wiley

WASHINGTON, D.C. — The Federal Communications Commission (FCC) will one day deregulate terminal equipment, according to former FCC Chairman Richard E. Wiley, who also believes deregulation of the entire data communications marketplace should be considered.

In the keynote at the recent Data-Comm 78 here, Wiley noted that one partner in the "marriage" of computer and communications "comes to the alter with freedom of action as its hallmark, while the other approaches with all the trappings of regulation."

While government regulation is needed to protect the public interest, "the free market should be inhibited only where it is absolutely necessary to do so," Wiley said.

In the late '60s, the FCC began a "determined effort" to inject competition into certain selected areas of the telecommunications market that had been dominated by AT&T, he noted.

"Over the last decade," he said, "the policies adopted by the commission have permitted new entry in private line and specialized communications services; have permitted the interconnection to the nationwide telephone network of new and innovative terminal equipment registered with the FCC; have opened the skies to a first generation of domestic satellites; have increased the usefulness of new services by requiring unrestricted shared use and resale of common carrier private lines; and, in the process, have opened the door to the age of computer and data communications."

He recalled that in 1971, the FCC attempted to define the "regulatory interface" between DP and communications. Within five years, the line drawn between DP and message switching has become technologically outdated. Drawing such a line today becomes, in his words, "increasingly a metaphysical undertaking."

"The intelligent Dataspeed 40/0, for example, marketed by a subsidiary of AT&T, was considered to be DP by the FCC's Common Carrier Bureau but data communications by a narrow majority of commissioners," he noted.

"It is clear that the cases will get even closer. No matter what demarcation points the agency may adopt, technology will blur them. I predict the FCC will have to go one way or the other.

"For the commission to take on the regulation of the huge and complex DP market is, to me, simply unthinkable. And thus, eventually, I believe that the FCC will have to deregulate terminal equipment altogether," Wiley said.

That suggestion raises at least three problems, according to Wiley. "The first involves the current Communications Act, although I do not feel that congressional action would be needed.

"The second issue is the 1956 consent decree which bars AT&T from engaging in an unregulated business. To bar Western Electric from the data communications market, in my opinion, would not serve the public interest. Thus, I would hope that serious consideration might be given to modifying the decree, Finally, there is the question of what is part of the equipment and what part of the communications system," he noted.

Wiley cited as an example the controversy regarding Bell's Dataphone Digital Service as to whether the Customer Service Unit is a true terminal device or an integral aspect of the entire system. "IBM-Comsat's Satellite Business Systems also requires terminal installations which are interactive with the satellite. Are these to be terminals, and unregulated, or part of the communications service and regulated?

"I don't have the answers to the issues I pose," Wiley conceded. "However, as a former regulator who has never been completely enamored of the virtues of regulation, I think it is healthy to at least consider the possibilities of deregulation. Indeed, while we're at it, we might even consider whether data communications should be deregulated altogether. This, of course, would require legislation."

Wiley estimated that 50% of the U.S. gross national product — including more than half of our total wage bill — is devoted to the production, processing or distribution of information.

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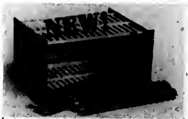

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Taiwan's Hardware Demand Remaining High

By Jeffry Beeler
CW Staff

WASHINGTON, D.C. — Healthy economic growth and expanding DP applications in assorted industries have ensured continuing high demand for computer hardware in the Republic of China (Taiwan), according to market projections released here recently by the U.S. Commerce Department.

Between 1976 and 1977, the computer and peripherals market grew 19% from $35.7 million to $42.6 million, and growth will average 21% annually through 1981, when sales will total $78.8 million, the Commerce Department predicted.

Because the Republic of China produces none of its own CPUs and few of its own peripherals, the country relies almost exclusively on foreign suppliers, especially the U.S., for its DP needs. Even though U.S. hardware prices average 20% to 40% higher than those of competing nations, American vendors still accounted for more than $29 million, or 70% of Taiwan's total DP imports.

By the end of this year, U.S. shipments will surpass $55 million for 71% share of all imports, Commerce predicted.

Japan, the second highest exporter of DP equipment to the Republic of China, shipped almost $5.9 million worth of computers and peripherals last year and will boost that volume to $10.8 million during 1978, Commerce officials noted.

Of the total computer and peripheral market in Taiwan, sales of large- and medium-scale CPUs accounted for an estimated $21 million in 1977 and will rise to nearly $39 million in 1981, for an average annual growth of more than 16%.

Medium, Large Systems

Last year, U.S. sales of large- and medium-scale computers to the Republic of China totaled $16.2 million and accounted for about 76% of the country's total imports in that hardware category, according to the department. During the next four years, the U.S. share of the Taiwanese medium- and large-scale market will drop slightly, although volume will rise an average of 13% to exceed $26 million.

In the minicomputer and microprocessor sector, sales will increase from $4.7 million last year to an estimated $12.5 million in 1981, for an average annual growth of 27%. As with large- and medium-scale CPUs, the minicomputer and microprocessor sector will be dominated by U.S. vendors, who will account for about an 80% share of the market through 1981, the Commerce Department predicted.

Taiwan did not begin using minicomputers and microprocessors until 1967, when NCR Corp. installed a 399 system at the Taipei Post Office headquarters. Since then, their use has expanded rapidly; today minis and micros outnumber large computer systems in the island nation, the market predictions noted.

In the peripherals sector, sales will jump from $17.3 million in 1977 to $27.7 million in 1981. At the same time, the U.S. share of that market will jump from 56% to 71% as American sales to the Republic of China double from the 1977 level of $9 million, the department added.

Because of their speed, diskette drives account for most of the storage systems sold in Taiwan, although some users also favor tape cassettes for their storage and handling advantages. Extended core units and external semiconductor memories, on the other hand, are almost unknown in the country, Commerce officials noted.

Among data entry devices, keypunch units still dominate the land, although some industry observers have detected a trend toward key-to-disk systems. Through 1976, only Taiwan's Tax Reform Bureau operated an optical character reader system, but five optical mark readers have been installed throughout the country, some in universities for checking examinations and others for demonstration by sales representatives, the department said.

Magnetic ink character recognition equipment, meanwhile, has failed to gain a toehold in Taiwan except at the Central Post Office and Chang Hwa Bank.

In the output device sector, CRT terminals will continue to operate primarily with minicomputers, although the units have also found increasing applications with large-scale systems. Direct, on-line CRT systems operate chiefly in the Taiwanese military, which has an estimated 150 of the devices, compared with about 50 in the private sector, the Commerce Department noted.

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31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
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Two U.S. Firms Get $7.5 Million Qantas Order

SAN FRANCISCO — Qantas Airways has placed a $7.5 million order with two Bay Area computer equipment vendors.

Most of the order went to Amdahl Corp., which will supply the Australian airline with two 470V/5s. Memorex Corp. will fill the rest of the order by supplying peripherals for the CPUs.

Qantas installed the first CPU at its Sydney, Australia, headquarters early in March. The companion CPU will follow in April, Qantas officials said.

Together, the two machines, which will replace an equal number of IBM 360/65s, will perform all the airline's DP functions except reservations, departure control and data communications and message switching. The two IBM machines will continue to control reservations and departure, while data communications and message switching will be transferred to Interdata, Inc., equipment, Qantas spokesmen said.

Explaining why the airlines chose the Amdahl CPUs, Ron Benjamin, computer and communications manager for Qantas, said, "One of the deciding factors in Amdahl's favor was the ability to deliver and install computers before our peak April-June period." The company's current DP load for accounting, stores inventory, payroll and other standard applications had outstripped the capabilities of its previous machines, he noted.

The Qantas order marks the first time an Australian company has bought an Amdahl computer, Benjamin added.

Though only half the size of the computers being replaced, the Amdahl CPUs will provide four to six times the computing capacity and serve the company's DP needs for at least five years, he said.

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Too Many Regulations Seen Slowing Industry Invention

WASHINGTON, D.C. — Regulatory actions in this city work to the disadvantage of users and the rapidly changing computer industry alike, John M. Eger, former head of the White House Office of Telecommunications Policy, said here recently.

"The government is killing the goose that lays the golden egg through regulation," Eger, now a private attorney and consultant, charged.

These government regulations, he contended, have had a severe impact on invention and innovation and have caused the rate of innovation to slow in this country.

At the same time, he said, the information society is with us already and a new world order for controlling developments in that area is "just around the corner."

But while this is happening, few here are grappling with the crucial issue of how to spur innovation, he indicated. For example, Eger pointed to AT&T.

He noted that AT&T has a plant worth $80 billion, but because of the 1956 consent decree with the Justice Department, it is not allowed to use that plant for anything other than communications.

Because of this, "[it tries] to make everything look like communications" and that "distorts the marketplace," he said.

With the close marriage of computers and communications, we may be slipping into a state where developments in the computer industry will be regulated, he added.

It would be better, he said, to "free AT&T" and allow the firm to compete in all areas.

This could be done through the rewrite of the Communications Act of 1934 that is presently under way in Congress, he said.

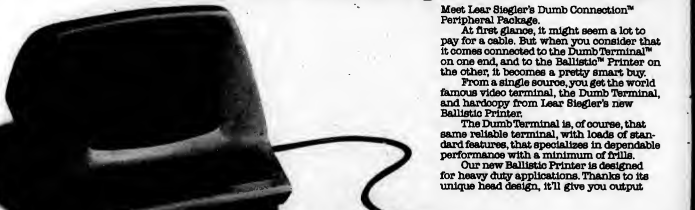
Congress could define what areas of the present AT&T business are suitable for monopoly status and have only those areas of the business regulated.

At the same time, Congress could deregulate the rest of the communications field, allowing AT&T and others to compete at will — through separate unregulated subsidiaries in the case of AT&T.

Orders & Installations

Brock & Blevins Co., Inc. of Rossville, Ga., a power plant fabrication and construction firm, has ordered a Univac 90/30 system.

The City of Sacramento, Calif., has ordered a Univac 90/70 system valued at more than $1 million.



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Sponsors Detail Jerusalem Conference Program

JERUSALEM — Sponsors of the Third Jerusalem Conference on Information Technology have announced speakers and program details for the event, which will take place here Aug. 6-9.

Regarded by some as the summer's major world computing conference, the show will stress the theme "Computers, Communications and Technology Transfer."

Invited speakers and their topics include Jean Sammet (the state of programming languages); George Glaser (electronic funds transfer systems); Iann Barron (the future of computer technology); Uzia Galia (building computers in a developing country); David Golden (technology transfer); Jacques Stern (communications systems); Robert Weissman (time-sharing servcie companies); D. Ben-David (computer-aided design); and R. Schteingart (hospital systems in developing countries.

Sessions and panels planned for the subject of technology transfer include "A General Approach to Technology Transfer"; "Technical Developments Supporting Technology Transfer"; "Medical Technology Transfer; and Industrial/Commercial Experience With Technology Transfer."

In the area of computer and communications technology, sessions will include the following subjects: fault tolerant computing; applications of machine descriptions; hardware and software technologies for developing countries; emerging domestic and regional communications satellite systems; advances in data communications; future of peripheral devices and network.

In addition, attendees will be able to take advantage of a program of social, historical, travel and professional interest.

Sponsors expect a major Israeli political figure will greet the delegates to the Third Annual Jerusalem Conference, as Golda Meir and Ephraim Katzir did at previous conferences. Student competitions between teams from the U.S., UK and Israel will also take place as will a computer chess tournament, social events and professional tours to various Israeli university and industrial computer installations.

The computer chess tournament, the first in Israel, will involve at least four programs, including Chess 4.6.

Those wishing to attend the conference as delegates may obtain program information by writing to JCIT3 Secretariat, Department of Computer Science, 4226 Ridge Lea Road, Amherst, N.Y. 14226.

Foreign Orders & Installations

The Dutch Ministry of Finance has ordered a terminal network for its tax service from Philips Data Systems Nederland B.V. in Rijswijk.

Marcol Computer Services, Ltd., a systems house based in London, has signed an OEM agreement with Honeywell Information Systems Ltd. to purchase 10 Level 6 minicomputer systems.

Bentalls, Ltd., a British department store chain, has ordered an NCR Corp. point-of-sale system valued at approximately $2 million. The network will eventually include about 240 NCR 2151 terminals in stores. All terminals will be linked to an NCR 8400 system, which will be installed in Kingston.

Argos Distributors Ltd., a catalog showroom chain in Britain, has ordered additional point-of-sale equipment to provide more timely and accurate inventory and sales information. The company will install 90 NCR 280 retail terminals equipped with Cassette recording units. As sales are recorded on the terminals, data is captured on the cassettes for subsequent processing.

The Republic of Korea Ministry of Education, located in Seoul, has ordered nine Hewlett-Packard Co. 3000 Series II general-purpose systems to be installed in major universities and colleges throughout the country and eventually to link the campuses with a distributed computing network. The systems are worth more than $3 million.

Kundenkreditbank-Deutsche Haushaltsbank, KGaA, of Dusseldorf, W. Germany, has ordered 571 Bunker Ramo Bank Control System 90 terminals. In the final expansion phase, all of the bank's branches will be integrated into the system, and it is expected that the number of display terminals will double. The order is valued at $4 million.

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Executive Corner

- M. Ron Duies Jr. has been named executive vice-president at DSG, Inc.

- Dr. David M. Carlson has been elected president and chief executive officer of International Automated Machines, Inc.

- David M. Goodman has been elected chairman of the board of directors of Wavetek.

- George F. Knapp Jr. has been elected chairman and chief executive officer at U.S. Telephone and Telegraph Corp. Frederick W. Gibbs has been elected president and chief operating officer.

- At Norden Systems, Leo Botwin has been promoted to senior vice-president of engineering of the United Technologies subsidiary. Promoted from managerial posts were James J. Alimena to vice-president of product engineering; William W. Kingston, vice-president of systems engineering; and Daniel R. Nuzzo, vice-president of contracts and product support.

- Carl F. Freeland has joined the management team of Pansophic Systems, Inc. as vice-president of research and development.

- Data Card Corp. has announced the appointment of two vice-presidents: Robert J. Keyport as vice-president fo Minneapolis operations and Charles M. Frank as vice-president and controller.

- Charles A. Zraket has been elected executive vice-president and a member of the board of trustees of the Mitre Corp.

- Burt Isaacson has been appointed executive vice-president of operations at Cramer Electronics.

- David Mack has been elected chairman of the board and secretary of DDP Products, Inc.

- Wilbur S. Mann has joined the Gerber Scientific Instrument Co. as a vice-president and general manager of its systems division.

- Frederick L. Zieber has been elected vice-president of Dataquest, Inc.

- Herbert D. Montgomery has been named corporate vice-president for operations administration at Pertec Computer Corp.

- William L. Goldstein has been appointed vice-president of marketing/sales at Digital Communications Associates, Inc.

- Herbert G. Waite has resigned as vice-president of marketing at Persci, Inc. to assume the presidency of Technical Design Labs of Princeton, N.J. Bob Erickson will assume all of Waite's responsibilities until Waite's successor is named.

- Harry A. Steinberg has been appointed director of Decision Data Computer Corp.

- Walter H. Trumbull Jr. has been named president and chairman of the board at Electro-Mach Components, Inc. Vincent P. Tarushka has joined the firm as manufacturng manager.

- John W. Luke has been elected a director of Computer Sciences Corp. This follows his recent election to a corporate vice-president post and appointment as president of CSC's Data Services Group. John J. Kramer has been promoted to president of the Infonet Division.

- Edgar M. Fields, Jr., has been named a vice-president of Planning Research Corp. Data Services Co.

Earnings Reports

ANDERSON JACOBSON
Three Months Ended Dec. 31

	1977	1976
Shr Ernd	$.15	$.12
Revenue	6,633,000	5,282,000
Earnings	362,000	273,000
9 Mo Shr	.43	.33
Revenue	19,711,000	15,279,000
Earnings	963,000	769,000

APPLIED DIGITAL DATA
Year Ended Nov. 30

	1977	1976
Shr Ernd	$1.01	$1.21
Revenue	33,150,025	23,437,191
Earnings	5,255,251	4,595,340
3 Mo Shr	.27	.35
Revenue	10,526,378	8,676,778
Earnings	1,417,296	1,322,166

CALIFORNIA COMPUTER
Three Months Ended Jan. 1

	1978	1977
Shr Ernd	....	$.12
Revenue	$29,242,000	29,094,000
Earnings	(82,000)	390,000
6 Mo Shr	....	.20
Revenue	55,815,000	58,607,000
Earnings	(669,000)	657,000

COMPUTER USAGE
Year Ended Sept. 30

	1977	1976
Revenue	$9,163,474	$9,180,014
Loss	654,820	446,321

DATA DESIGN LABS
Three Months Ended Dec. 31

	1977	1976
Shr Ernd	$.22	$.13
Revenue	6,948,000	5,696,000
Earnings	221,000	297,000
6 Mo Shr	.42	.26
Revenue	13,448,000	11,306,000
Earnings	418,000	297,000

THRESHOLD TECHNOLOGY
Three Months Ended Dec. 31

	1977	a1976
Revenue	$393,683	....
Loss	114,467	....
6 Mo Shr	792,760	....
Loss	198,568	....

a-Comparable figures unavailable; company changed its fiscal year-end from July 31 to June

AMPEX
Three Months Ended Jan. 26

	1978	1977
Shr Ernd	$.47	$.34
Revenue	82,864,000	69,905,000
Tax Cred	1,807,000	1,338,000
Earnings	5,122,000	3,726,000
9 Mo Shr	1.35	.77
Revenue	234,296,000	209,190,000
Tax Cred	5,696,000	2,838,000
Earnings	14,744,000	8,371,000

CINCINNATI MILACRON
Year Ended Jan. 1

	1978	1977
Shr Ernd	$2.84	$1.35
Revenue	531,848,000	448,422,000
Earnings	20,869,000	a9,991,000
3 Mo Shr	.91	.55
Revenue	143,446,000	113,623,000
Earnings	8,644,000	a3,994,000

a-Includes $607,000 net gain from liquidation of subsidiary.
b-Reflects two-for-one stock split paid Jan. 10, 1978.

COMPUTER NETWORK
Three Months Ended Dec. 31

	1977	1976
Shr Ernd	$.26	$.08
Revenue	4,399,000	1,595,000
Earnings	328,000	126,000
9 Mo Shr	.78	.27
Revenue	11,853,000	4,510,000
Tax Cred	....	80,000
Earnings	875,000	392,000

DATAPOINT
Three Months Ended Jan. 31

	1978	1977
Shr Ernd	$1.05	$.65
Revenue	38,525,000	24,300,000
Earnings	3,572,000	2,122,000
6 Mo Shr	1.88	1.24
Revenue	72,326,000	46,833,000
Earnings	6,412,000	4,076,000

GENERAL DATACOMM
Three Months Ended Dec. 31

	1977	1976
Shr Ernd	$.30	$.14
Revenue	6,499,000	4,280,000
Earnings	461,000	210,000

INFORMATION INTERNATIONAL
Three Months Ended Jan 31

	1978	1977
Shr Ernd	$.11	$.18
Revenue	3,312,208	3,734,534
Earnings	266,267	496,632
9 Mo Shr	.34	.58
Revenue	8,209,436	11,297,643
Earnings	693,242	1,524,716

MEGADATA
Year Ended Oct. 31

	1977	1976
Shr Ernd	....	$.34
Revenue	$6,207,712	5,847,864
Earnings	(88,622)	294,723

TANDEM COMPUTERS
Three Months Ended Dec. 31

	1977	1976
Shr Ernd	$.21	....
Revenue	3,909,000	$769,000
Tax Cred	301,000	....
Earnings	636,000	(301,000)

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But CAT Shakedown Predicted

Medical Imaging Mart to Top $1 Billion by '82

SAN JOSE, Calif. – Sales of medical diagnostic imaging systems will top $1 billion by 1982, but the computer-assisted tomography (CAT) scanner segment of that market will experience a major shakedown by 1980, Creative Strategies International (CSI) predicted in a recent market study.

Forecasting sales trends in the diagnostic imaging systems market, the study said sales in the scanner sector of the market have peaked and will decline in the U.S. during the next five years. Although growth in non-U.S. markets will partly offset these losses, scanner sales will flatten by 1982, the market research and consulting firm added.

Particular Growth

Two segments of the diagnostic imaging systems market – ultrasound scanners and nuclear medical systems – will experience especially large growth through 1982, CSI predicted.

Spurred by developments in real-time scanning, ultrasound scanners will lead the market in sales growth with compound yearly increases approaching 28% by 1982, the study said. Nuclear medical products, meanwhile, will integrate with computers to form new products that promise to complement CAT scanners, CSI added.

By 1982, ultrasound imaging will constitute the most significant sector of the diagnostic imaging systems market, with annual sales of $269 million. As with CAT scanner suppliers, however, vendors of ultrasound imaging equipment will experience a major shakedown that will eliminate almost all the competitors except those with interests in other imaging technologies, the report warned.

Legislation Influential

CSI also predicted that government legislation and review committee regulation will play a significant role in the development of the diagnostic imaging systems market. Between July 1976 and July 1977, state review agencies rejected 35% of the proposed purchases of CAT scanners, and the future promises more of the same, the market research firm said.

The study, *Medical Diagnostic Imaging*, costs $695 and is available from CSI at Suite 275, 4340 Stevens Creek Blvd., San Jose, Calif. 95129.

Report Examines Growth Outlook For Medical DP

SAN JOSE, Calif. – "Medical Information Systems," an industry report prepared by Creative Strategies International (CSI), examines the future growth of the medical information industry.

Although sales estimates for 1982 are $1 billion, compared with 1977 sales of $476 million, the report pointed out major obstacles to the industry's growth.

Considered particularly critical are resistance by health administrators who question the cost-effectiveness of the capital investment required to implement a medical information system and the growing concern over the confidentiality of patient data.

Potential Boon

Yet the Carter Administration's push to improve health care delivery may prove a boon to the industry. CSI predicted the industry will benefit from the cost control and reporting legislation favored by the administration.

Patient care applications such as admission-discharge-transfer and medical records are the most significant market segment, according to the report.

The report sells for $695. For further information, contact CSI at Suite 275, 4340 Stevens Creek Blvd., San Jose, Calif. 95129.

Acquisitions

Computer Automation, Inc. said recently that negotiations for the acquisition of **General Computer Systems, Inc.** of Addison, Texas, have been broken off.

Both firms had previously announced the execution of a letter of intent for Computer Automation to acquire General Computer Systems, but the parties have been unable to reach a definitive agreement on the terms of the proposed acquisition, according to Computer Automation president D.H. Methvin.

U.S. Datacorp has acquired **Valley Datacorp**, a computer output microfilm service firm headquartered in Phoenix. No changes are planned in the operation of the firm.

Control Data Corp. has an agreement to acquire selected assets of **Micro-Bit Corp.**, a privately held firm in Lexington, Mass. Terms of the agreement were not disclosed.

Quanta Data Systems has acquired the **Commercial Processing Division** of the Louisiana Computing Corp.

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New Feature Design — Plan and develop the future hardware and software evolution of current large scale fully stored program controlled switching systems. Develop new features for existing equipment, study new features impact on existing systems, and estimate the development costs and requirements.

Product Design — Design advanced fully stored program controlled systems for telecommunication application. Develop large scale software programs in an on-line, real-time environment and related digital hardware using CMOS, Shottkey, TTL as well as Static and Dynamic MOS.

International Design — Develop design philosophy and Architecture Definition of switching systems for international markets. This involves high level design structure development and detailed studies of critical problem areas. Define specific design implementation tasks, review progress and coordinate developments with implementation teams abroad.

SOFTWARE DESIGN

Data Base Software — Responsible for logical and physical data base design and implementation related to telecommunications systems. Develop programs which automate the generation of data base contents for these systems in an IBM 370 environment using PL/1.

Support Software — Involved in compiler, assembler, simulator maintenance and enhancement as well as other IBM 370 software developments. Support effort is related to micro and large processor developments.

Application Software — Large scale development in telephone system real-time control. Diagnostic and fault recognition software, administrative software involving real-time data base administration, switch and network overload procedures as well as executive software.

SYSTEMS CONTROL AND TESTING

Development and execution of comprehensive test plans to evaluate the performance of large stored program switching system prototypes. Execute configuration management on all hardware, software, and components and maintain project control for all activities. System evaluation performed on both laboratory prototypes and initial field site locations.

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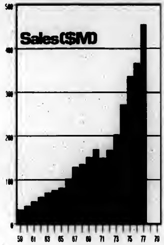

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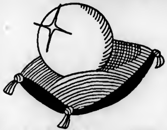

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55435
612-830-6650

SOFTECH

The Software Technology Company

That's not just a slogan, it's a commitment.

TO INNOVATION IN STATE-OF-THE-ART SOFTWARE ENGINEERING

TO OUR CLIENTS THROUGHOUT THE WORLD

TO THE PEOPLE OF SOFTECH

If you're a talented software professional looking for high visibility in a small, growing company, we're eager to talk with you, especially if you are qualified in the following area:

We offer excellent salary arrangements and outstanding benefits, including life, health, dental and orthodontics coverage, long term disability, retirement plan, and bonus based on individual productivity. Send resume to Sally Jablon Silver, Dept. 160, SofTech, Inc. 460 Totten Pond Rd., Waltham, MA 02154.

Positions are available in Dayton, Ohio, Nutley, NJ, Waltham, MA, and Washington, D.C.

We are a recognized world leader in applying engineering principles to systems analysis, design and software development. SofTech is involved in constant improvement of systems, software tools, and techniques used in developing a variety of applications; from inception through delivery.

In both the private and government sectors, SofTech is daily meeting the demands and requirements of our clients. Whether the problem is the solution to a highly complex design issue or the production of application software for large systems, SofTech engineers are there with the know-how and creativity to be responsive and adaptable to changing client needs throughout the life cycle of the system.

An ongoing reaffirmation of the principle and spirit of independent action has been a basic tenet of the SofTech philosophy from inception. We recognize individual contribution as the primary force behind our vigorous growth and success. The people of SofTech ARE SofTech.

COMPILER DESIGNERS

There are several openings for individuals with significant experience in designing or implementing and optimizing compilers for high order languages such as ALGOL, JOVIAL, PASCAL, or PL-1. Background in analysis or design of programming languages or compilers is required. Experience with structured programming techniques and the use of high order language for implementing large software systems would be a distinct advantage.

SOFTECH

an affirmative action equal opportunity employer

The Software Technology Company

BUSINESS MANAGER

IBM COMPATIBLE PRODUCTS

We are seeking a seasoned Business Manager to direct our efforts in adding non impact printers to our line of IBM software compatible products.

Position carries complete P&L responsibility. Initial task will be to define product requirements and make vendor selection. Position also includes responsibility for our existing tape and impact printer lines.

Requires minimum 10 years directly related experience and an in-depth understanding of the IBM EDP market. Knowledge of non impact printing technologies and user applications a must. MBA with technical undergrad degree is desirable. SEND RESUME INCLUDING SALARY HISTORY TO:

D.G. Robinson
Peripheral Systems Group
CONTROL DATA CORPORATION
2200 Berkshire Lane
Plymouth, Minn. 55441

An Affirmative Action Employer M/F

ENGINEERS AND PROGRAMMERS

Lockheed Electronics Company is seeking qualified applicants for immediate positions at NASA's Johnson Space Center in Houston, Texas. These positions are in support of the Space Shuttle and Earth Resource Programs and require applicants experienced in the following areas:

- **PUBLICATIONS SPACIALIST:**

To originate scientific/engineering publications and coordinate efforts of editors and proofreaders. Prefer applicants with a minimum of eight years experience.

- **DIGITAL DESIGN ENGINEERS:**

With experience in design and development of digital/analog equipment including computer interface, display, control and signal conditioning hardware.

- **MECHANICAL/AEROSPACE ENGINEERS:**

Responsible for structural, thermal or environmental control systems analysis. Applicants should have knowledge of FORTRAN computer programming, math modeling, and be capable of using large scale digital computers in the analysis of engineering problems.

- **SIMULATION APPLICATIONS:**

Required to support dynamics simulation development and operations. Experience required in realtime, digital, analog and hybrid computer program development and operation of large man-in-the-loop simulations. Prefer applicants who have worked with spacecraft/aircraft GUIDANCE and CONTROL systems.

- **COMPUTER MAINTENANCE ENGINEERS:**

To be cross-trained to support a large, diverse simulation laboratory. Facility includes analog computers, mini-computers and second and third generation medium-to-large scale systems manufactured by several companies.

- **CONTROL SYSTEMS ENGINEERS:**

With experience in flight controls; guidance, navigation and controls; digital design; computer interface, and data systems programming experience on HP 2100 computers.

- **PROGRAMMING ANALYSTS:**

Responsible for performing analysis and developing appropriate computer models. Experience in FORTRAN IV and ASSEMBLY language required. Some positions require UNIVAC 1108 programming experience.

- **COMMERCIAL/BUSINESS APPLICATIONS PROGRAMMERS:**

With experience in design, development of financial, accounting and control systems using COBOL, FORTRAN, or ASSEMBLY languages.

- **STATISTICIANS:**

With advanced degree and experience in pattern recognition, clustering, feature selection, discriminant or multivariate analysis.

Send resume in confidence to Bill Jancha at Lockheed Electronics Company, Dept. C-20-22, 1830 NASA Road #1, Houston, Texas 77058.

LOCKHEED

An Equal Opportunity Employer M/F

PROGRAMMER/ANALYSTS

Kranzley and Company, a leading systems development firm, requires professional personnel in the following fields:

APPLICATIONS PROGRAMMING

- COBOL — 2 years or more
- OS/VS or DOS/VS
- Financial, accounting applications a plus

TELEPROCESSING — if your skills range over the following:

- BAL — 3 years or more
- OS/VS or DOS/VS or Minicomputer
- CICS or equivalent T.P. Monitor
- Sysgen experience a plus
- Data base access methods
- Communications line control and access methods

DATA COMMUNICATIONS — if your skills range over the following:

- Line protocols
- Front-end processors
- Network design and simulation
- Line servicing routines

For consideration, send your resume or call —

Kranzley & Co.

1010 South Kings Highway
Cherry Hill, New Jersey 08034
609 795-1515

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Company Inquiries Invited

COMPUTER/ELECTRONICS SPECIALIST

Exceptionally qualified person to establish and direct PDP-11 minicomputer network, including DECLAB 11/34 system and several 11/03 microcomputer satellites. Responsibilities include: implementing initial system software, developing software package to run and analyze psychology experiments, writing other specialized programs, designing interfaces for peripheral devices. Experience with PDP-11 family and solid electronics background necessary; experience with psychology applications preferable. Salary negotiable. Write: Chairman, Psychology Department, Mezes Hall 330, University of Texas at Austin, Austin, Texas 78712. An Equal Opportunity/Affirmative Action Employer.

PROGRAMMERS

Multi-unit South Jersey firm, seeks individuels desiring to develop anelytical abilities as well as programming skills. Must be effective communicator with USER departments, technical personnel and menagement. Background should include femiliarity with IBM DOS/VS multi-programming environment. Must have 1-2 years actuel programming experience in ANS-COBOL end RPG II. Exposure to DB/DC concepts desirable.

We ere located 40 miles from Philedelphie in e desireble community. Successful candidetes will enjoy en attractive starting salary, cereer growth potentiel and competitive benefit program. For prompt consideretion, please forwerd resume and salery history to:

Industrial Relations Department
NATIONAL FREIGHT, INC.
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Vineland, NJ 08360
An Equal Opportunity Employer M/F

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Our success and growth have resulted in an exceptional career opportunity for you if you've been honing your MVS or JES3 skills by doing, and now desire to take the next step in the "learn-do-teach" cycle. Join the growing software instruction team at Amdahl and learn why so many people say that teaching is the most fun they've had in their DP careers.

SOFTWARE INSTRUCTORS

We currently have openings at our Sunnyvale, California headquarters for qualified professionals ready to take that next step. We invite you to send your resume in confidence to Phil Beckhelm, Professional Employment, Amdahl Corporation, 1250 East Arques Avenue, Sunnyvale, CA 94086. If you're not quite ready or need more information, please call Charlie Wareing, 408/735-4326 (collect), in our Software Education Department. He'll be happy to talk with you. We are an equal opportunity employer.

amdahl

Power Systems Engineers Analysts Programmers

Arizona Public Service Company, a major Southwestern utility has the following outstanding opportunities in the computer area:

Software Systems Analyst

Systems Engineer with experience in softwere design end implementation in the araes of CRT display end supervisory control softwara for electric utilities. Will work in both conceptuel end detailed phases of projects.

Programmers Operating Systems

Experience in scientific progremming with specific knowiedge of reel-time opereting systems, I/O operations, interrupt processing and basic executive services. Experience in Leeds and Northrup LN-5500 operating systems desireble.

Programmer/Analysts

Business epplicetions progremming end enelysis. Financiel, payroll/personnel, construction systems experience desirebla. PL/I, OS/MVS, beckground required, COBOL desireble.

The Southwest provides unlimited year 'round recreetional activities, a unique blend of Spanish end Indien heritage and expanding culturai opportunitias. Arizone Public Service is e growth-oriented utility offering e good salery and benefits package end an excellent working environment. To apply for these career openings, send your resume including salery history to Mr. Tom York, Employment Manager, APS, P.O. Box 21666, Station 1199, Phoenix, AZ 85036.

Arizona Public Service Company

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PROMOTE YOURSELF

Move up to increased pay and promotional opportunities and the life style of your choice

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Mgr Tech Svcs	Lge scale IBM. East & West coast openings. Mini exp a plus	$35M
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207 Fox Lane
Wallingford, PA 19086
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FLORIDA URGENT!

SYSPROG-OS/VS, HASP/JES2, SYSGEN (1.7or3). IMS, 3704em.des	To 23K
SYSPROG-CICS Ints. min 1 yr BAL	To 18K
SYSPROG-360/MVT, HASP, TSO	To 23K
DB/ANAL-IMS, util. Cobol OS/JCL, DB des (2)	To 23K
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S/A-Fin. apps, des, best only	OPEN
Applications Prog/Anal	
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DATA PROCESSING OPERATIONS MANAGER

Detroit based building matarisis retallar with 8 homa cantars and relatad businasses seaks individual who will ba responsibla for tha oparation of tha DP dapartment. Position raports to Vica Presidant of Financa. Spacific responsibilities to includa systam development and implamentation and control of all aspacts of data procassing function, including acquisitions of hardwsre and softwara.

Experlanca with Singer Systam 10 and ratall POS highly desirsbla, but not nacessery. Should be familiar with on lina anvironmant, and must be abla to work affactively with administrators at all levals. Minimum of 3 years axparlenca necassary. If qusilflad, plaasa send rasuma snd salary history and raquirements in confidenca. Contact Oanlal Toms.

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5300 E. Nevsda
Detroit, MI 48234
(313) 368-2100

Equal Opportunity Employer

DATA PROCESSING OPERATIONS MANAGER

A progressive corporation with operating headquarters in Eastern Pennsylvanie seeks en experienced Date Processing Operetions Maneger. This position offers responsibility for 60 people involved in Data Entry, Deta Control, Computar Operetions, end COM activities. It also provides an opportunity to work with Systems Design and Tachnical Support Professionals in the design and utilizing of sophisticated information systems. As a key member of a dete processing steff, this individuel will interact directly with senior menagement to define opereting schedules and capabilities and document operating procedures.

Interested candidates should have 3-6 years of deta processing experience including 2 years of data processing operations menegement. Previous demonstrated ability to motivate all levels of data processing personnel, creation and implementation of work-flow schemes, and excellent writtan and verbal communication skills are desired. Familierity with on-line as well es betch processing operations, mini-computer applicetions, end deta base technology ere critical to successful achievement of position objectives.

Compensation will include e starting salary to the low 20's, relocation assistance end e competitive fringe benefit program.

Please forward e resume including salary history to:

CW Box 1500
797 Washington St.
Newton, MA 02160

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Equal Opportunity Employer m/f/v/h

ENGINEERING & MANUFACTURING-DAYTON

NCR's Engineering & Manufacturing Division in Dayton, Ohio, develops and produces financial terminal products. The requirements of the systems business are constantly changing, providing unlimited opportunities for the creative individual.

Opportunities currently exist at all levels (Trainees to Project Leaders) for individuals possessing a background in the following areas:

ELECTRICAL DESIGN ENGINEERS

- Microprocessor Applications
- Digital & Analog Circuits
- Electrical Control Circuitry
- Terminal Peripherals
- Familiarity with Microprocessor Programming Helpful

SOFTWARE EVALUATION ANALYSTS

QUALITY ASSURANCE

- Design Analysis
- QA Certification
- Multi-tasking OS concepts
- 8080 Assembly Language
- CDBOL language

PROGRAMMER/SYSTEMS ANALYST

SOFTWARE DESIGN

- Microprocessors
- Minicomputers
- Operating Systems
- Distributed Processing Systems
- Systems Constructors & Generators
- Communications Software
- 8080 Assembly Language
- COBOL Language

These positions require a BS in EE, CS or related discipline. We encourage responses from new graduates.

We invite you to be a part of our future in a rapidly changing and challenging industry. Please submit your resume and salary requirements to:

NCR

Mrs. Judith E. Chorazewitz
Engineering & Manufacturing-Dayton
Employment, CW 320
NCR Corporation
Dayton, Ohio 45479
An Equal Opportunity Employer

SUN BELT - HOUSTON

Large Distributor is expanding Staff for Data Base Environment. Need Programmer/Analysts, Systems Programmers, Project Leaders. 3031, 145, PL/1, ALC, COBOL, CICS. Ground Floor Opportunity. Excellent Benefits. No Travel. Relocation Paid.

Send Resume in Confidence to:
Dick Arehart

Grocers Supply Co.

P.O. Box 14200
Houston, Texas 77021
(713) 747-5000

PROGRAMMER/ ANALYST

Self-starter with 2-6 years BAL, COBOL, IBM 360/370 OS JCL, or CICS experience a plus. Proven design and programming skills, financial (savings & loan) knowledge desirable. College degree preferred. If you wish to work in a highly competitive, progressive environment, please send your resume with salary history and requirements to Nancy Williams:

GREAT WESTERN SAVINGS

450 Newport Center Dr.
Newport Beach, CA 92660
An Equal Opportunity
Affirmative Employer M/F

REAL TIME BANKING

Swiss Bank Corporation, one of the leaders in the International Banking field is actively designing a Real Time Banking system.

Several positions are open immediately in the following areas:

Communications/Systems Programmer

- Duties include design thru realization of a new Data Base On-Line System.
- CICS Applications and Internals, DL/1 and IBM (Bal) are required.
- ANSI-COBOL and Banking Applications a plus.

Analyst/Programmer

- Duties Include Analysis and Development of Real Time Banking Applications, Utilizing Structured Design/Programming Techniques. 2-3 years experience in ANSI-COBOL in a banking environment is required.
- CICS, Librarian and DL/1 definite pluses.

If you are looking for an excellent future, based on individual performance, competitive salary and top benefits package, call (collect) . . . Mr. Lou Garcia, EDP Manager (212) 938-3587 or write him in confidence at:

Swiss Bank Corporation

EDP Department, 4 World Trade Center
Box 395, Church Street Station, N.Y., N.Y. 10008

An Equal Opportunity Employer.

Dynamic systems development shop has two openings:

Programmer Analyst

Systems Programmer

Software needs include CICS, DL-1, SVS/MVS. Applications development languages are COBOL, ALC and PL/I. Send resume and salary requirement to:

Personnel Office
Dallas County
Hospital District
5201 Harry Hines Blvd.
Dallas, TX 75235
Equal Opportunity Employer

SUPERVISOR OF DATA PROCESSING:

$20,332-$29,172

Plans, initiates and coordinates city-wide electronic data processing services. Seven (7) years of electronic data processing experience three (3) of which shall have been in a supervisor capacity. Forward resume to:

Sim Bernstein
Personnel Director
City of Stamford
429 Atlantic St.
Stamford, Conn. 06901

FIELD SERVICE ENGINEERS

THE NIXDORF CHALLENGE

Immediate openings are available in New York City, Philadelphia, New Jersey, Los Angeles, Detroit and San Francisco. Openings also available nationwide.

You will be joining a company whose remote batch terminals, distributed data processing systems, on-line interactive displays, and general-purpose business computers are recognized worldwide for their excellence. Our challenge is to increase these markets and increase the demand for our sophisticated state-of-the-art equipment.

FIELD SERVICE ENGINEERS

Responsibilities will include the installation, maintenance, and repair of Nixdorf computer systems and equipment. Background should include a thorough knowledge of electromechanical and state-of-the-art peripheral equipment gained through technical schooling, military service, or work experience.

Meet this challenge and earn an excellent income, a generous benefits package which includes dental insurance and educational reimbursement. This is a unique opportunity to realize your career objectives.

For immediate consideration, send your resume to:

Hugh McGettigan

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NIXDORF COMPUTER CORPORATION
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DATA PROCESSING

SYSTEMS DESIGN/SUPPORT

Brodart, an industry leader in information services for the library marketplace, is expanding its systems design and programming capabilities in line with the increasing demand for its "products".

SYSTEMS ANALYST

Operating in a project team environment, analysts participate in the full range of systems design and analysis activities for a variety of applications areas: Inventory Control, Order Entry, Marketing, Accounting. Project assignments will provide exposure to large CPU as well as on-line mini-computer environments. One to three years of systems design experience including completion of one major project, a working knowledge of design techniques (file structures, access techniques, etc.) and programming requirements, and a familiarity with on-line mini-computer applications will be useful in satisfying position objectives.

PROGRAMMER

In support of project team design efforts this individual will modify existing programs or create new programs to satisfy systems requirements. Position activities include design of program logic, selection of subroutines, coding of program instructions, preparation of test data and analysis of program test performance, and program documentation. This assignment will provide significant exposures to mini-computer applications. At least one year of applications programming experience in a mini-computer environment and a familiarity with BASIC PLUS are highly desirable. (PDP programming experience most desirable.)

These positions offer competitive compensation plans including a comprehensive fringe benefits program. Assistance is provided to facilitate your relocation to our headquarters operation in Williamsport.

Interested candidates are requested to submit a full resume and salary history for consideration. Qualified candidates will be contacted by April 3, 1978.

Constance G. Bona
Selection & Placement

BRODART THE LIBRARY COMPANY

BRODART, Inc.
1609 Memorial Avenue
Williamsport, PA 17701

An Affirmative Action
Equal Opportunity Employer (M/F/V/H)

DATA MANAGER

Needed for Professional Standards Review Organization. Must have experience and proven ability in working with collection, processing and display of data. Must be familiar with statistical evaluation techniques and data confidentiality. Will be responsible for working with and monitoring a data processing subcontractor. Familiarity with abstracting and coding medical care data is desirable. Must be able to work effectively with a variety of people and have a desire to assume management responsibility.

Starting salary to $18,000.

Send resume and salary requirements to:

Indiana Area III PSRO
310 Medical Center Building
Fort Wayne, Indiana 46802

We are an equal opportunity employer.

Computer/Data Processing Instructor

Responsibilities: Conduct feasibility studies, prepare alternative programs for computer/data processing; make evaluations; implement the results of the curriculum; teach the courses as designed.

Qualifications: Masters preferred, including 18 or more credit hours in data processing with 3 years of practical and teaching experience; Bachelors minimum with 3 years of related experience.

Salary and rank commensurate with preparation and experience. To begin July 1, 1978. Send resume by April 15, 1978 to Mrs. Joan C. Weaver, Personnel Director, Volunteer State Community College, Nashville Pike, Gallatin, Tenn. 37066. *Volunteer State Community College is an Equal Opportunity/Affirmative Action Employer.*

Software Sales

We're looking for [illegible] Candidates [illegible] line of products.

Software Service

We're looking for software technicians to assist our customers in using our products. Openings exist for people with all levels of experience in on-line systems. Minimum requirements include proficiency in 360/370 Assembler and a working knowledge of COBOL, PL/1, or FORTRAN. If you enjoy a problem-solving environment and like the instant feedback that comes from making customers happy, we'd like to hear from you.

Software Development

We're looking for junior-level programmers to participate in the design and development of new products for on-line systems. You'll work side-by-side with top-notch software specialists in a challenging environment that offers ample opportunities for growth and reward. Candidates should know 360/370 Assembler, be familiar with DOS or OS job control, and have a working knowledge of standard IBM file access methods.

[illegible] systems inc.
[illegible] avenue
[illegible], connecticut 06851
[illegible]

TSI has just completed its 11th successful year. We have a reputation for on-line system expertise and a growing product line that now includes TASK/MASTER, KEY/MASTER, and Flexicom. We offer excellent benefits, top wages, and an enjoyable and challenging work environment. Resumes, including an indication of which job opportunities are of interest, should be sent to the Personnel Department at our Norwalk address.

SOFTWARE DEVELOPMENT
CORPORATE OFFICE OPENINGS

United Computing Systems, Inc., an established and growing national and international firm in Kansas City, has senior and junior level openings in:

SYSTEMS SOFTWARE: Development of software for state-of-the-art computers, CDC and Cray, operating systems permanent files for inter-systems communication, and language development.

COMMUNICATIONS SOFTWARE & DEVELOPMENT: Qualified individuals are needed to participate in the growth of UCS's international telecommunications network - UNINET. This growing network serves multiple data centers from over 150 cities within the U.S. and Europe. Responsibilities include design, development, and implementation of software for a network of mini-computer based systems consisting of front ends, nodes, and local concentrators. You must have a minimum of 1 to 2 years experience in Assembler language with a general understanding of real time programming. Senior level applicants should have network experience with knowledge of BISYNC, 200 UT, HASP, HDLC, SDLC, X.25 or other communications protocols desirable.

In addition to a good salary and excellent benefits, we will offer you a stock purchase plan, tuition reimbursement, and pension program.

Please submit resume, including salary history, to:

Personnel Department
United Computing Systems, Inc.
2525 Washington
Kansas City, MO 64108
or call (816) 221-9700

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equal opportunity employer m/f/h

SYSTEMS PROGRAMMERS

The Central Intelligence Agency has several positions for experienced Systems Programmers to work in a complex, multi-system, IBM 370-oriented computer installation. There is special interst in persons with backgrounds in any of the following areas:

- CICS
- Operating System Internals (OS/MVS, JES II/JES III)
- VM/370 System Internals
- Computer Systems Measurement and Performance Enhancement
- Systems Configuration and Selection
- Telecommunications and Front End Processors
- 360/370 Assembly Language Programming
- Minicomputer Systems Internals (UNIX)

Salary range: $17,056 to $28,725 depending upon qualifications, plus all normal Federal employment benefits. Location: McLean, Va.

U.S. Citizenship is required.

Please send complete resume in confidence to: Personnel Representative, Dept. A, Room 821, P.O. Box 1925, Washington, D.C. 20013.

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EDP SOUTHEAST

PROG: OS, Cobol	$18K
SR. PROG: CICS	$20K
SOFT: DOS	$22K
SOFT: OS	$24K
SYS ANAL: Mfg.	$25K

Several positions open in the above categories with leading Southeastern companies. Mail confidential resume or call Joe Sawyer, the EDP Personnel Specialist, (803) 233-2546.

EXCEL PERSONNEL

1421 Laurens Rd., Suite 200A
Greenville, S.C. 29607

PROJECT MANAGER

COMPUTER SYSTEMS
+22,344-$29,268 yearly

The Orange County Assessor's Department is seeking an individual who is thoroughly experienced in all phases of computer services and systems management. Requires a proven record in computer related management and computer systems development plus a thorough comprehension of systems analysis and design, mathematical analysis, and computer hardware capabilities and limitations.

Experience should include land data systems, project management techniques such as CPM and PERT, project resource requirements, estimating, scientific computer modeling, business applications, plus presentations of analyses to non-technical persons or groups. No resumes; deadline March 31, 1978.

COUNTY OF ORANGE PERSONNEL DEPT.

825 N. Ross St., Rm 8150
Santa Ana, CA 92701
(714) 834-2844
Equal Opportunity Employer M/F

FLORIDA DEC PROGRAMMER ANALYST

Immediate opening for programmer analyst with a minimum of two years experience on Digital Equipment Corporation's PDP 8 and/or PDP 11. Heavy DIBOL experience. We are a rapidly expanding Florida based firm looking for an aggressive, innovative individual to develop business oriented application software. Accounting and general business backbround is a definite plus.

Send resume and salary requirements to:

Robert Minshall
D.P. Services, Inc.
P.O. Box 20106
St. Petersburg, Fl. 33742

Programmers
Systems Pros

TAKE TTI TO THE LIMIT!

TTI is **Transaction Technology, Inc.**, a fast-rising subsidiary of Citicorp, New York, specializing in design and development of electronic funds transfer systems. Our continued success in this fascinating field, vital to the banking industry, creates the need for more talented people with a background in on-line real-time systems, experience with large data bases and knowledge of communications networks for these growth-geared career openings:

• SYSTEMS ENGINEER

This position requires a Systems Analyst with a functional orientation, with recent transaction processing design and some project management experience. Will handle requirements analysis, feasibility designs, specifications and general Systems Engineering functions. Should have experience with large and medium scale hardware and knowledge of a high level language such as COBOL, ALGOL or PL1. BSEE or BSCS, with 5 or more years experience.

• SYSTEMS ENGINEER

This opening involves general network systems design, with responsibilities for high-level flowcharting. Background in architecture and structured programming necessary. BSEE or BSCS with 5 years experience, with at least 2 years in network design.

• SYSTEMS ENGINEER

We seek a technical type with equal capabilities in software and hardware for this position, which will entail primary responsibilities in performing analysis (including computer configuration, modeling and architecture). BSEE, MSEE or CS plus 3 years experience will be required. Exposure to transaction processing and medium to large scale main frame would be a plus.

• NETWORK OPERATIONS PLANNER

Candidate will interface with field operations group in this position which involves planning of network control center capabilities and functions, maintenance tools, diagnostic packages and data collection and analysis. Requirements include a BSEE coupled with at least 2 years experience with operations and data communications network design background.

• SENIOR COMMMUNICATIONS PROGRAMMER

Qualified individual will design, develop and maintain communications software for our large scale distributed network. Experience with BISYNC and SDLC protocols and assembly language. BSEE or equivalent experience.

• REAL-TIME SYSTEMS PROGRAMMERS

Responsibilities will include design, development, and maintenance of network control functions for our large scale distributed transaction network. Real-time assembler programming experience required. BSEE or BSCS or equivalent experience.

Exercise your own capabilities to the limit, and at the same time work in an atmosphere where technology itself is at its highest - at TTI. We also offer exceptional salaries, tangible growth potential and a wide-ranging benefits program that is designed to cover most all of your needs. Take us for all you're worth – forward resume with salary history to

Karen McFarlane

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Los Angeles, CA 90024
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TTI

PROGRAMMER/ANALYST

ANSI COBOL; IBM 370/158, MVS with IMS and TSO

We offer an environment for achievement and success

Bucyrus-Erie, a major manufacturer of mining machinery and construction equipment, has an immediate and challenging position available for the individual with a minimum of 3 to 5 years experience (preferably with manufacturing systems exposure). This is primarily an on-line, real-time opportunity that offers a generous starting income, a comprehensive benefits program and outstanding opportunities for both professional achievement and personal growth.

FOR IMMEDIATE ATTENTION, PLEASE SEND YOUR RESUME IN COMPLETE CONFIDENCE TO:

BUCYRUS-ERIE
1100 Milwaukee Ave.
South Milwaukee, WI 53172
We are an Equal Opportunity Employer M/F

B
BUCYRUS-ERIE
E

Data Processing

SYSTEMS SOFTWARE SECURITY SPECIALIST

Virginia based bank holding company seeks highly motivated individual to establish procedures and controls to insure integrity and security of Computer Hardware and Systems Software. Responsibilities to include the planning and scheduling of reviews for EDP Systems. Software and Systems procedures, the preparation of short term and long range audit plans and other related functions. Minimum 3-4 years systems programming is preferred. Degree in Computer Science is required. Must have thorough knowledge of ALC programming and familiarity with COBOL. IBM 370 DOS/VS GRASP environment. Excellent salary and benefits package. Submit resume with salary requirements to:

CW Box 1502
797 Washington St.
Newton, MA 02160
Equal Opportunity Employer M/F

Faculty
School of Business Administration

George Mason University, growing State university located in Washington, D.C. metropolitan area, is seeking one or more qualified persons for appointment to the School of Business Administration for teaching in Management Science or Information Systems. Duties will include teaching graduate and undergraduate courses, committee work, and some research. Associate Professor: doctorate required; business and/or teaching/research-publication experience expected; Associate Professor: doctorate (or significant progress on dissertation) business and/or teaching/research-publication experience is desired. For persons with less credentials than those desired, appointment may be at the rank of Instructor. All positions begin September 1978. Salary is competitive. Send resume by March 31, 1978 to Dr. Willis H. Martin, Decision Sciences Coordinator, School of Business Administration, George Mason University, Fairfax, Virginia 22030. AA/EOE.

Computer Professionals

San Francisco Bay Area

Opportunities exist in the San Francisco Bay Area for people with experience in the following areas

Software Product Manager

Requires good customer interface ability, strong feel for software marketplace (systems and applications) and ability to deal with technical staff. Position will lead a small group of product planners in software development

Salary to $36,000

Manager of Systems Programming

Requires a senior systems programming background with project leader experience. Experience should include work in a development environment. Mini/micro operating systems experience helpful

Salary to $35,000

EDP Consultant

Requires financial systems design and implementation experience with a knowledge of COBOL. Work involves consulting to client companies. Minimum travel required

Salary to $30,000

Project Manager and Senior Software Development Manager

These 2 positions work in a strong development environment with a group of highly skilled systems professionals. Desired experience includes project management, OS/VSI or OS/MVS internals, assembly language and DASO knowledge

Salary to $28,000

Call, Come In, or forward your resume to:
Rich Clark -- Ed Ioli -- Carl McNall
220 Sansome St., Suite 1390
San Francisco, CA 94104
(415) 981-6500

an employer retained personnel service

The Computer Branch, Inc.
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Terminal Systems

$28,000-$35,000

Exeter Associates
Executive Recruiters

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P.O. Box 823
Computer Park
Hampton, N.H. 03842
(603) 926-6712

COMPUTER CUSTOMER ENGINEER

Position available in Princeton, New Jersey to join an in-house computer maintenance group that maintains all equipment on site. We are looking for people with maintenance experience on D.G. Eclipse, CDC 6600, Cray I or any other large computer. If you enjoy a challenge and want to learn state-of-the-art equipment let us hear from you. IDA/CRD offers prime shift work hours, no travel except for training and a liberal fringe benefits package.

Submit resume to:

Administrative Officer
Institute for Defense Analyses
Thanet Road
Princeton, N.J. 08540
Equal Opportunity Employer

CADILLAC EDP OPPORTUNITIES

ALL FEE PAID NATIONWIDE COVERAGE CONFIDENTIAL

CADILLAC offers you assistance in finding a position that meets your objectives. . . NATIONWIDE or in your present locality. For 45 years CADILLAC has been helping professional people find new positions that offer greater growth more responsibility, new experience, relocation, higher salary, etc. . . . we'll make every effort to do the same for you. Just send your resume, or a note outlining your experience. . . no cost or obligation to you.

Sys Prog (Tech Support)	$20-30	Prog (Applications)	$14-20
Sr. Anal/Proj Mgrs	$22-30	Prog (MINI, PDP, etc)	$16-23
System Anal	$20-25	EDP Auditors	$18-22
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Mark Fuller
CADILLAC ASSOCIATES, INC.
32 W. Randolph St., Chicago, IL 60601
(312) 346-9400

EDP Professionals . . .

You know your capabilities – now here's your chance to use them.

Digital's Corporate Information Systems organization (CIS) offers EDP professionals a true growth environment . . . one where you're encouraged to acquire new skills and take on new responsibilities.

Because we provide corporate-level support to many areas of Digital, and must keep up with the corporation's rapid growth, we're constantly seeking talented, highly motivated EDP professionals for newly-created positions.

SENIOR SYSTEMS ANALYSTS PROJECT MANAGERS

This is an excellent opportunity for knowledgeable professionals to become internal consultants or project leaders in a fast-growing area. You should have a proven track record in the development and implementation of major business systems as well as a solid background in system development and programming in a business environment. A knowledge of data communications or order processing in a timesharing environment would be a plus.

PROGRAMMER/ ANALYSTS

We're looking for Programmers with at least 1 year of experience with COBOL or BASIC-PLUS who are interested in becoming Programmer/Analysts. Also, we are seeking Programmer/Analysts with at least 3-5 years experience for a variety of challenging growth positions.

For these positions, a knowledge of large-scale interactive timesharing systems is a plus. Experience with DECsystems 10 or PDP 11 would be helpful.

These opportunities with Digital's CIS offer the chance to assume wider responsibilities, utilize your communications skills, and pursue a dual career path into either management or senior technical areas. And successful CIS experience provides an opportunity to move into other organizations within Digital.

If your present company isn't offering this type of challenge and growth, you should investigate your possibilities in Digital's dynamic, user-oriented environment. Please forward your resume, including salary history to Bill Grady, Digital Equipment Corporation, Dept. C3203807, 129 Parker Street, Maynard, Mass. 01754. We are an equal opportunity employer m/f.

digital

EDP Professional

Newark, New Jersey

We are seeking an EDP professional looking to advance your career opportunities. This position on our expanding EDP audit staff will offer the following challenges.

- Preinstallation system reviews
- Postinstallation system reviews
- Design and implementation of computer assisted audit techniques
- Support internal audit staff

You should have a college degree and a minimum of 3-4 years' systems/programming experience in a sophisticated computer environment. You will be trained in EDP auditing techniques, and good written and oral communications skills are essential. Familiarity with accounting and insurance concepts is desirable.

Salary range is mid to upper teens. We offer a comprehensive employee benefits package. Please send resume and salary history in strict confidence to: Director of Personnel.

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520 Broad St., Newark, N.J. 07101

Equal Opportunity Employer M/F

EDP PROFESSIONALS

• Internal Consultants (2) $33,000

Major NY bank seeks EDP Professional with solid project management exp in a 370/OS/VS environment. Excellent interpersonal skills & formal project life cycle exp required. Excellent opportunity to move into top EDP management.

• Hardware/Technology Evaluation $30,000

A number of client firms have very challenging opportunities for individuals with experience evaluating hardware (large scale & mini), software, word processing, etc.

• Management Consultant $29,000

Prestigious midtown NYC management consulting firm has positions open for Senior Analysts with experience designing & implementing IMS application systems. Very visible, excellent opportunity for growth.

• Systems Leader $27,000

NY financial firm needs Analyst/Programmer with solid OS/VS COBOL experience to function as a Project Leader. College degree plus financial applications desired.

For information on these & other career positions, please call or send letter/resume in confidence to:

JOHN SULLIVAN/DAN JARVIS

the jarvis walker group

535-5th Ave, NYC 10017 (212) 867-2650

SCIENTIFIC SYSTEMS ENGINEERS

McDonnell Douglas, St. Louis is seeking individuals with degree in Industrial Engineering or Computer Science and with experience in FORTRAN programming. Must have background in one or more of the following areas:

Geometric Modeling	Computer Graphics
Simulation Models	Data Base Systems
Distributed Processing	

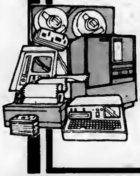
Explore the possibility of joining our team of skilled professionals in the expanding Computer Aided Manufacturing area developing advanced systems and technology by sending your resume to:

W. B. Kellenbergar
Section Manager,
Professional Employment
Department CW-78SE
P.O. Box 516
St. Louis, Missouri 63166

MCDONNELL DOUGLAS CORPORATION

An Equal Opportunity Employer m/f

Systems Analysts/Programmers



G. D. Searle & Co., an international leader known for quality and innovation in the Health Care industry, is seeking experienced DP professionals in the Systems and Programming areas at Corporate Headquarters located in Skokie. Positions currently available include:

LEAD ANALYST—SYSTEMS ANALYSTS

These positions will deal with the development of large-scale management information and retrieval systems, including problem definition, systems design, technical writing, and user interfacing associated with pharmaceutical research. Three to five years DP experience and systems analysis design, programming, timesharing and pharmaceutical research with COBOL and/or FORTRAN as well as a Bachelor's degree or the equivalent are required.

PROGRAMMERS

These positions will support the development and maintenance of information systems for scientific evaluation. Functions include programming and user interfacing for modification/maintenance of existing systems. A minimum of two years programming experience in FORTRAN, file management, and timesharing experience required. A Bachelor's degree in Math or Computer Science, or equivalent work experience, is preferred.

We offer an excellent salary and benefits program in a growing and stimulating atmosphere. Send comprehensive resume with salary history, in confidence, or call:

Darlena Brill
312/982-7513

SEARLE

G. D. Searle & Co.
P. O. Box 1045
Skokie, IL 60076

An Equal Opportunity Employer M/F/H

APPLICATIONS PROGRAMMERS

Excellent 8 to 5 shop seeks stable applicant with 2-5 years COBOL - IBM environment experience. Client's management approach is people oriented with emphasis on team development, top-down design, structured programming, structured walkthroughs, and rotating assignments between development and maintenance. Degree NOT required. Top benefits package and good upward mobility. Salary to $18K; Fee Paid.

Call or send resume to Carolyn Stewart, (214) 235-8371, P.O. Box 38271, Dallas, TX 75238.

PHOENIX CAREERS

APPLIED DATA SYSTEMS, A PHOENIX SOFTWARE COMPANY WITH NATIONAL MARKET, SEEKS PROGRAMMER/ANALYSTS WITH MIN 2 YRS COBOL EXP. SAL TO 24K. LIMITED TRAVEL. SEND CONFIDENTIAL RESUME TO A.D.S., P.O. BOX 2088, SCOTTSDALE, AZ 85252

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9 Project Leaders-To $26,000

Call collect: DUNHILL OF COLUMBIA, 4700 Forest Dr., Suite 217, Columbia, SC 29206 (803) 787-9767.

SYSTEMS PROGRAMMER

We have a challenging opportunity for an individual capable of filling a key position within our company. The person we seek will be responsible for the generation and performance evaluation of DOS/VS, CICS/VS, and VSAM as well as other related systems software. If you would enjoy having an excellent opportunity to grow and learn, a salary limited only by your ability, a competitive benefit program, a chance to work with the latest IBM hardware and software systems, and the contentment of working in a pleasant midwestern city, please contact:

Ronald D. Long, AVP

BRENCO AUTOMATION CENTER, INC.

717 Mulberry, Suite 503
Des Moines, IA 50309
(515) 283-2415
A subsidiary of
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PROGRAMMER/ANALYST

SENIOR

Experienced project leader in financial and accounting systems needed for business systems group — minimum 5 years exp. Background in COBOL, on line systems, design & analysis, OS. Must be able to communicate with all levels of management. Bachelor's degree preferred. Competitive salary and fringe benefits. Submit resume & salary history to Personnel Department.

PROGRAMMER/ANALYST

TECHNICAL

Challenging position for person possessing BSEE degree & 2 years experience with the IBM 370 system & an operating knowledge of FORTRAN. Prior power system analysis programming exp. preferred. Career opportunities. Competitive salary & fringe benefits. Submit detailed resume including salary history to Personnel Department.

DELMARVA POWER

800 King Street
Wilmington, De. 19899
Equal Opportunity Employer M/F

Software Engineers

Call COLLECT (415) 966-2995

GTE Sylvania Electronic Systems Group, Western Division, is a San Francisco Bay Area firm engaged in sophisticated communication command and control systems with some applications interfacing with large-scale data bases. We are seeking Software Engineers at ALL LEVELS who wish to participate in a professional, high-technology environment using structured design and coding techniques. Experience on the following computer/languages would be especially desirable.

PDP/11-45 & 70, UYK-7, NOVA, ECLIPSE, PASCAL, IFTRAN, CMS-2, and SIMSCRIPT.

Positions are available in the San Francisco Bay Area, Arizona, Washington DC, and in Europe. All positions offer an excellent salary, plenty of career challenge and growth opportunities, plus generous benefits including tuition reimbursement, medical, dental and life insurance, and stock purchase plan.

For immediate consideration, please call COLLECT (415) 966-2995 weekdays, 9:00am to 4:00pm PACIFIC STANDARD TIME. If unable to call, please forward resume with salary history to GTE Sylvania, P.O. Box 188, Mountain View, CA 94042, Attn. Dept. CW-476. An equal opportunity employer, minorities and females encouraged to apply. U.S. citizenship is required.

GTE SYLVANIA

COMPUTER SCIENCE PROFESSIONALS MEET THE CHALLENGE WITH GULF

Build a meaningful career in southwest Houston at Gulf Oil's newest and most advanced computer complex. Gulf Science & Technology, one of the operating companies of Gulf Oil, offers an excellent benefit package and competitive starting salaries for...

APPLICATIONS PROGRAMMERS

These positions offer the qualified data processing professionals challenging work assignments in a state of the art computer complex. These positions also offer outstanding potential for career growth and advancement for the person who is willing to meet the challenge.

Prerequisites include a degree in Computer Science or related field, 2-5 years experience in commercial applications programming using COBOL and/or ALC in a 370/OS-VS or MVS environment. Good working knowledge of IBM JCL and experience with IMS, TSO, and VSAM a definite advantage.

Salaries will be commensurate with education and experience. Qualified applicants are invited to submit their resumes including salary history to:

Mr. J.P. Haney

GULF SCIENCE
& TECHNOLOGY CO.

Drawar F-71
P.O. Box 36506
Houston, TX 77036

An Equal Opportunity Employer M/F

PROGRAMMER ANALYST

Our mid-town New York based International Public Accounting firm needs a versatile pro to work in Systems Development.

VARIETY:
minicomputers to OS environment

KNOWLEDGE:
4 years experience required in
RPG2, COBOL, FORTRAN & BASIC

A PLUS:
experience in BAL, PL1, DBMS

Minimum travel
salary commensurate with experience.
(our employees know of this ad)

Send Resume To CW Box 1506, 797 Washington St., Newton, MA. 02160.
an equal opportunity employer

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data base analyst

Travenol Laboratories, a health care industry leader, is currently seeking a qualified individual to support the development of IMS systems. The qualified candidate will provide technical assistance in system, program and data base design. Additional responsibilities will include the generation of required IMS control blocks and interface with programmers on coding, testing and establishment of test data bases.

To qualify, you should have a minimum of 3 years experience as an IMS Data Base Analyst or Programmer/Analyst for on-line IMS systems. Experience in data base design, MFS, PSB, and DBD control block generation and COBOL coding is also required. A background in manufacturing systems, data dictionary or IMS tuning techniques is highly desirable.

We provide an excellent salary and liberal benefits program. To arrange a confidential interview, send your resume with salary history to:

S. C. Washington

TRAVENOL LABORATORIES, INC.
One Baxter Parkway
Deerfield, Ill. 60015

An Equal Opportunity/Affirmative Action Employer

PROGRAMMER/ANALYSTS

WE WANT TO DISCUSS YOUR TOMORROW TODAY IN SUNNY FLORIDA

Are you interested in a challenging career where you can enjoy the quality of life that only Central Florida can offer? With a high school diploma and a minimum of three years programming experience, you have earned a Florida career. Prefer applicants who have IBM DOS/VS-POWER/VS shop experience. Must be able to code in COBOL. Prefer CICS experience. Qualified applicants should contact:

Mrs. C.M. Fredericks, Personnal Office

Board of Polk County Commissioners

P.O. Box 60
Bartow, Florida 33830
(813) 533-1161, Ext. 274
Equal Opportunity Employer M/F

MIAMI-DADE COMMUNITY COLLEGE

Systems Analyst

Assumes functional responsibility for analysis and programming support of part of the college's administrative activities, designs data processing systems, supervises subordinate personnel, establishes and maintains documentation, and trains personnel in the usage of new systems. Minimum requirements: Bachelor's degree in appropriate field and four years of data processing experience. Salary to $20,020, based on experience and qualifications, plus liberal employee benefits. Submit detailed resume to Personnel Services, 11011 S.W. 104 St., Miami, Florida 33176.

An Equal Access/Equal Opportunity Community Colleges

BANK or INSURANCE

We currently represent many banks & Insurance Co.'s throughout the country who are looking for qualified EDP personnel. Our prime needs are for people with financial experience in the $16-25,000 range. We need programmers, analysis, data communications, and management personnel. If you are currently in a bank or insurance company or would like to be in this environment, send your resume along with salary and geographical preferences to Tom Roberts. Companies always pay our fee.

don HOWARD Personnel, Inc.
360 N. Michigan Ave.
Chicago, Il. 60601
(312) 332-2341
Offices in Atlanta, N.Y., Dallas, N.J., S.F.

SYSTEMS ANALYST

$15,654 - $19,079

New position offering opportunity to work with DBMS and Tele-Processing or IBM 370, DOS/VS. Requires combination of education and experience in design and installation of EDP applications. Final filing date is March 28, 1978. Send resume to:

Tulare Co.
Personnel Dept.
Courthouse, Room 106
Visalia, CA 93277
(209) 733-6266
Equal Opportunity Employer

SENIOR SOFTWARE ANALYST

(Tele-Processing)

A unique opportunity exists within our data processing area for the talented DP professional who possesses a proper mix of education and experience to be able to tackle this challenging software assignment.

The individual selected will provide software enhancements and support Honeywell DN-355 and IBM 3704-5. To facilitate new teleprocessing oriented systems, give software support on specialized data transmission emulators and support IBM-3780 and 3270 along with giving terminal user support.

The successful individual will bring an intimate working knowledge of IBM "Binary Synchronous" transmission protocol, including in-depth knowledge of at least one terminal which uses it (IBM 3270, 2780, 3780), complete familiarity with the "EIA RS-232" interface convention, two years experience with communications software internals on a programmable "front-end processor" and knowledge of commonly used data transmission hardware.

If you have the "proper mix" which will be required to meet the challenge of this opportunity, please send your resume with an indication of current salary to:

Rich Pochowicz

SEARLE

G. D. Searle & Co.

4711 Golf Rd.
Skokie, IL 60076

An Equal Opportunity Employer M/F/H

ANALYST PROGRAMMER PROFESSIONALS

Medicus is a progressive company providing data processing and management services to hospitals. We are rapidly expanding our client base and scope of services throughout the nation.

We are currently seeking analysts/programmers who are interested in working with dynamic professionals to develop and install health care systems on IBM and Data General computers.

We currently have positions open in Georgia, New York, Illinois, Texas, and California.

If you would like to grow as a professional with a successful corporation, please write to the Personnel Coordinator at the address below.

MEDICUS SYSTEMS CORPORATION
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Cleveland, Ohio 44106

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Fold and insert order form (attached through binding) and remittance here.

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797 Washington Street
Newton MA 02160

FLORIDA

Data Processing Opportunities

Here is your opportunity to join Ryder Truck Rental, Inc., the world's largest truck rental and leasing corporation. We currently have a 370/168 running under SVS supporting both online CRT systems and an international intelligent terminal network under IMS/VS. We are seeking qualified individuals in the following capacities:

Senior Systems Analyst

Minimum of 3 years design experience using COBOL and OS/JCL in a large scale IBM system environment. Knowledge of online systems, structured programming, 3270 CRT's, TSO and IMS, as well as a college degree highly desirable.

Programmer/Analysts

We require heavy COBOL programming experience in large IBM system environment. IMS data base and teleprocessing background would be desirable.

Systems Programmer

The individual we seek must have prior experience with IBM 370 operating systems. Experience with SVS, MVS, HASP and/or JES-2 would be beneficial. The position to be filled will have responsibility including systems generation, systems performance evaluation and tuning, system software maintenance, and application programmer support.

If you feel you possess the background to join a successful professional team and desire an atmosphere of challenge in a growing MIS operation, please send your resume with salary listing to:

Barbara Edwards
Personnel Manager, MIS
Ryder Truck Rental
2850 Tigertail Avenue
Miami, Florida 33133
We are an EEO Employer M/F

Senior Sales Representative

Because of our rapid and successful growth as a computer terminal manufacturer, we are expanding our direct sales force in the Chicago, New York, San Francisco, and Los Angeles areas. The selected candidates will have at least 3 years' experience selling in the end user IBM replacement market. This is a unique opportunity for results-oriented individuals who could earn $35,000 - $50,000 annually in salary and commissions. For a confidential interview, send resume to.

Personnel Administrator
TRIVEX inc.
3180 Redhill Ave., Costa Mesa, CA 92626
equal opportunity employer m/f

PROGRAMMER / ANALYSTS

CALIFORNIA

We need articulate, versatile people to do a lot of things: analyze requirements. . .develop specifications... create documentation. . .write programs using COBOL and/or ALC. . .write JCL for OS/VS2 MVS.

The environment includes: IBM 370/158-3... MVS 3.7. . .IMS 1.1.4. . .TSO/SPF II. . .VTAM/NCP . . .Panvalet . .100 local terminals.

Qualified applicants will have at least six years of experience as a programmer using COBOL, ALC, JCL. Large scale complex on-line systems experience would be helpful. . .and interactive programming and IMS (DL/1) experience would be extremely helpful.

We're a substantial life insurance company operating in the West, a member of one of the nation's largest diversified financial services organizations. Salary and employee benefits are excellent.

Please send your resume and salary history to the Personnel Director, 2020 L Street, Sacramento, CA 95814.

CAL WESTERN LIFE®
California-Western States Life Insurance Company
An American General Company

An Equal Opportunity Employer (M/F)

STAFF ASSISTANT/ APL PROGRAMMER

The University Computing Center of University of Massachusetts at Amherst is looking for a talented person to help in the design and implementation of a new APL system. The successful applicant must have at least a B.S. in Computer Science or equivalent, and should have extensive experience with APL and assembly language programming. A background in Code Generation, Theory of Computation, or Compiler Design is desired. Salary commensurate with experience. Send resume to Charles D. Lyman, University Computing Center, University of Massachusetts, Amherst, MA 01003. THe University is an Affirmative Action/Equal Opportunity Employer.

DATA PROCESSING INSTRUCTOR

Req.: Master's-data processing or equiv. Teaching exper. preferred, knowledge of curriculum development would be an asset.

Triton College is one of the largest community colleges in Illinois, located in the western suburbs of Chicago. We serve 23,000 students.

We offer a competitive salary and excellent fringe benefits.

Send letters of application to:

Dr. Frederick J. Gaskin
Vice President-Personnel
Triton College
2000 Fifth Avenue
River Grove, Illinois 60171
An Affirmative Action
Equal Opportunity Employer

PROGRAMMER ANALYST

to $25,000

Software specialist reporting to mgr. M.I.S. 5-8 yrs exp in programming. BAL, COBOL. Honeywell exp a plus. Mfg. environment. Prime area. Co. pays all fees. Contact Art Toht, (312) 665-4455, S-H-S INTERNATIONAL, 1616 E. Roosevelt Rd., Wheaton, Il. 60187 (Priv. search firm)

DATA PROCESSING MANAGER

Moraine Park Technical Institute is accepting applications for a Data Processing Manager. Bachelors of Business Administration with Computer Science major or equivalent; three years of progressively responsible experience in data processing one year of advanced or responsible professional experience. Salary range $17,000-$21,000 with fully paid fringe benefits. Contact Philip Stoll, Moraine Park Technical Institute, 235 North National Avenue, Fond du Lac, WI 54935, Telephone: (414) 922-8611. April 1 deadline. EOE

PACIFIC N.W. & ALASKA

Special needs for Technical Systems Engrs, knowledgeable with IBM, IMS Data Base Internal #1, VSAM #2. Salary approx. $20K Our clients range from mfg'g, banking, insurance, hospitals. Also need programmer/analysts, and supervisory systems analysts. Send resume or call KEN MURNEY collect (206) 455-0582. All fees paid.

CAREER SPECIALISTS, Inc.
1200 112th N.E., #101
Bellevue, WA 98004

SYSTEMS PROGRAMMERS SUNBELT-To $25,000

Our client, a Fortune 500 mfg co, due to continued growth seeks several IMS/VS Systems Programmers. Excellent growth potential and career benefits. Desirable Carolina location. All fees paid by client to include interview and relocation. Reply in strict confidence including salary to J.K. Schwab.

FOX-MORRIS PERSONNEL CONSULTANTS
1742 Southern National Center
Charlotte, NC 28202
SPECIALIST IN EDP PLACEMENT

MUMPS/RSTS

Versatile programmer/technician needed to assist in development of hospital information system based on a MUMPS/RSTS/8080 network. Intimate knowledge of PDP-11 hardware and software desired. BS in CS, EE or 1-3 yrs experience in data base design and management preferred. Contact Eva Yarne, Employment Manager, Good Samaritan Hospital, 1015 N.W. 22nd Ave., Portland, OR 97210. An equal opportunity employer.

SCIENTIFIC PROGRAMMER

$28K

We require a superior programmer who can rapidly grasp the nuances of special purpose architecture and software development facilities, and make a prime contribution to the software development effort. Because of the real-time nature of the applications, the individual we seek must be a highly qualified and sophisticated Programmer, with at least 3 years experience in assembly language programming for real-time (interrupt driven) applications. Experience with Data General Eclipse or DEC PDP-11 mini-computers very helpful, but not mandatory.

We offer in addition to excellent compensation solid benefits and an informal, stimulating environment.

Please forward resume in confidence or call:

BILL JACKSON
COMPDATA
161 Highland Ave., Needham, MA 02194
(617) 449-4350
We are an equal opportunity employer

Systems Analysts Programmer Analysts

HANES HOSIERY is seeking aggressive, EXPERIENCED, career-oriented systems professionals with a broad range of business systems skills.

These positions offer opportunity to participate in the development of sophisticated EDP systems using the latest in software and hardware features including: powerful on-line program development software, data base management, transaction processing software, and distributed processing. We are committed to a position of leadership in EDP utilization and consequently offer excellent opportunity for professional growth and accomplishments.

Experience with large system series HONEYWELL software will be an advantage but NOT a prerequisite. From a central dual 66/60 system, we utilize the advanced GCOS operating system, TDS, TSS, and IDS.

HANES HOSIERY offers attractive fully competitive salaries plus comprehensive benefits, and the security of being with a very strong successful expanding company. Another plus is our southeastern location affording very pleasant living in a mild, sunny climate, in a community of 230,000 people that is nationally recognized for its cultural achievements.

If you feel that you qualify, please call collect, Allan Spicer.
(919) 744-2724 or (919) 744-2518

If unable to call, please send resume including SALARY DATA in confidence to:

Management
Recruitment Coordinator
HANES HOSIERY
A Division of the Hanes Corporation
A "FORTUNE" 500" COMPANY
P.O. Box 1413, Winston-Salem, N.C. 27102
NO EMPLOYMENT AGENCIES, PLEASE!
Affirmative Action Employer

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Data Professionals

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PROJECT LEADERS
SYSTEMS ANALYSTS
PROGRAMMER ANALYSTS
PROGRAMMERS
DATA BASE ANALYSTS

We offer an excellent salary, an outstanding benefits program plus urban/suburban living in Southeastern Wisconsin with easy access to some of the best recreational facilities in the Midwest.

Interested individuals may send a brief letter or resume including salary requirements to:

Richard Schmidt,
Employment Services Department
Blue Cross
of Wisconsin
401 West Michigan Street
Milwaukee, Wisconsin 53201

Equal opportunity employer m/f

WANGWANGWANG

FOR OUR OPERATIONS IN BURLINGTON EDUCATION CENTER

Program Development Consultant

An opportunity exists at the Education Center for an experienced program and course developer. This person will interface between the Training Center, Marketing Organizations as well as the Development Center for New Products. This position requires a person qualified to develop and write training materials for sales, support courses and in-field personnel.

REQUIREMENTS:

- excellent writing skills
- word processing or data processing experience
- the ability to communicate well with Marketing Organizations
- prefer college degree

This career position offers growth and challenge with a dynamic growing corporation.

Excellent salaries and earning potential plus superior company benefits. Please send resume, including academic background and salary history and requirements to:

Linda G. O'Connor
Career Opportunities
(617) 851-4111

WANG LABORATORIES, INC.

One Industrial Avenue, Lowell, MA 01851

We are an affirmative action/equal opportunity employer.

SOFTWARE PROFESSIONALS

Immediate openings exist at our St Louis headquarters for qualified Software Personnel

Qualified candidates should have experience in SYSGENS, PTF application, problem determination, and assembler language coding

Currently we are using the SVS operating system with future plans to move to MVS, on IBM 370's Model 158 and Model 145 with HASP shared spool A BS degree is required and experience with MVS and CICS/VS is a definite plus

We offer an excellent salary, comprehensive benefits and opportunity for advancement Please send resume and salary history in confidence to

Anheuser-Busch, Inc.

Manager, Salaried Employment
Department G-5
721 Pestalozzi
St. Louis, MO 63118

An Equal Opportunity Employer M/F.

MINI PROGRAMMER ANALYST

Our Information Systems Center has an immediate requirement for an experienced mini programmer analyst for business applications. The position involves online-interactive systems development/programming and distributed processing with communication links to a 370-168 system. The successful candidate will have previous experience with minicomputers, preferably Hewlett Packard or Data General equipment. A background in 370-168, MVS, IMS with COBOL/PL-1 languages would be helpful.

Please submit detailed resume with salary history to:

Ms. Janyce Albert
Professional Staffing Office
Collins Divisions
Rockwell International
400 Collins Rd. N.E., M/S 120-126 RDS
Cedar Rapids, Iowa 52406

Rockwell International

Equal Opportunity Employer M/F

UNIVERSITY OF HONG KONG

Teaching Staff in Computer Science

The University of Hong Kong is considering the establishment of a new Department of Computer Science in the next Triennium 1978-81 and will be appointing teaching staff at the following levels:

Chair
Senior Lecturer
Lecturer
Assistant Lecturer

Applications from suitably qualified candidates are invited. Annual salaries (superannuable) are:
Chair: will be within the professorial range and not less than HK$131,640
Senior Lecturer: HK$92,280 x 3,960 - 123,960
Lecturer: HK$59,340 x 4,020 - 67,380 BAR 71,400 x 4,020 - 79,440 x 3,960 - 99,240
Assistant Lecturer: HK$43,260 x 4,020 - 55,320
(US$1 = HK$4.60 approx.)

Starting salary will depend on qualifications and experience.

Further particulars and application forms may be obtained from the Secretary-General, Association of Commonwealth Universities, 36 Gordon Square, London, WC1H DPF, England, or the Assistant Secretary (Recruitment), University of Hong Kong, Hong Kong. Closing date for applications is April 7, 1978.

OPERATING SYSTEMS MANAGER

Managerial/professional position with the University of Nebraska Computer Network. Duties include: supervise the generation and maintenance of the operating system, job entry subsystem and conversational remote job entry subsystem in a large IBM 360/65 and 370/148 environment using DOS/VS, OS, and SVS; configure hardware and software including telecommunications services; supervise staff of professional programmer/analysts.

QUALICATIONS: Bachelors degree in Computer Science, Electrical Engineering or equivalent. Five years of experience in data processing including a minimum of two years in programming modifications to computer operating system components and a minimum of two years of supervisory experience. Application deadline date 4/4/78. Mail resume to: University of Nebraska-Lincoln, Personnel Dept.-Employment Section, Room 128, 501 N. Tenth St., Lincoln, NE 68588.

EOE/AA

Dean, School of Business Southwest Texas State University

Southwest Texas State University invites nominations and applications for the position of Dean of the School of Business.

Minimum requirements: Earned Doctorate required. College or University teaching experience in a related area preferred; administrative experience desirable. Inquiries must be postmarked by March 17, 1978.

Southwest Texas State University is an affirmative action, equal opportunity employer. Starting date: September 1, 1978.

APPLY: Dr. Celia Morgan, Chair, Search and Screen Committee Department of Finance and Economics, School of Business, Southwest Texas State University, San Marcos, TX 78666, (512) 245-2566.

RSTS in COLORADO

Expanding company has two positions available for individuals experienced in the following fields.

TIMESHARING SALES

- Represent packaged applications software
- Offer generic computer resource
- Develop new market areas
- Salary plus commission

PROGRAMMER/ ANALYST

- BASIC PLUS under RSTS/E
- MBA degree or accounting background
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- Salary range $14K-$18K

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13693 East Iliff Ave.
Denver, CO 80014
(303) 758-4619

Programmer/ Designer

Fuel Oil O.S.

Tymshare, Inc., an international leader in the computer services industry, is offering an excellent opportunity to join a creative team in our fast-paced Fuel Oil Division.

You'll be responsible for designing detailed machine logic flow charting for the solution of business problems, analyzing equipment requirements and capabilities, and modifying programs to suit changes in systems requirements or reconfigurations. Three years' experience with BAL on the IBM 360 required, DOS/JCL teleprocessing knowledge a must.

We offer a salary commensurate with experience and company benefits. Send resume in confidence to, or call: Dennis Raynoha
(516) 420-1122

TYMSHARE INC.
an equal opportunity employer

275 Broadhollow Road
Melville, New York 11746

SYSTEMS PERFORMANCE SPECIALIST

Amtrak has an immediate opening for an experienced Systems Performance Specialist to work in the area of performance measurement/capacity planning.

Successful candidate will have 4-6 years experience with hardware/software monitors, MVS performance group tuning, IMS tuning, TSO tuning, DASD performance analysis, and applications tuning and monitoring.

Individual will work in an environment consisting of two 370/158's, shared DASD, 330/3350's, MVS/JES2, TSO, IMS DB/DC, VTAM/NCP and a large distributed processing network.

Excellent salary, benefits, growth opportunities. Send resume, in confidence to: J.R. Bruna, Personnel, Amtrak, 400 N. Capitol Street N.W., Washington, D.C. 20001.

An Equal Opportunity Employer M/F

Amtrak

N/C SYSTEMS ENGINEERS

McDonnell Douglas, St. Louis, has openings for individuals with BS or MSEE with experience in digital logic & computer programming to work in Computer Aided Manufacturing (CAM), particularly in area of real-time monitoring and control. Areas of responsibility will include advancing technology in area of N/C and other machine tool related applications. If you meet the above requirements, explore the possibility of joining our creative team by sending your resume to:

W. B. Keflenberger
Section Manager,
Professional Employment
Department CW-78N
P.O. Box 516
St. Louis, Missouri 63166

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EDP

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Senior Programmer Analyst

You will assist in the design and implementation of many of Shaklee's new systems. You must be able to interface with users on all problems, and be capable of directing in detail upgrades to the system. You must have a minimum of three years' COBOL programming experience in DOS, systems analysis and data base application. Financial and marketing systems experience would be helpful.

Programmer Analysts

Several new openings have been created for programmer analysts with at least three years' experience. Knowledge of IBM, DOS and COBOL is essential; you will be writing and implementing detailed program specifications.

For consideration, please send your resume with salary history and requirements to:

Tom Waterman, Personnel
2036 National Avenue
Hayward, CA 94544

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Senior Systems Analyst

Three to five years computer experience, including at least two years in design of on-line systems. GE Mark III Network experience desirable. Fortran a plus.

MMS develops and implements systems for the international shipping industry. Send resume and salary history.

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300 Broad St., Stamford, Conn. 06901 (U.S.A.)

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EDP SYSTEMS PROFESSIONALS

Due to recent expansion, a major international consulting organization currently has over 50 openings throughout the U.S. for qualified EDP Systems professionals. These consulting positions are for staff through manager level, with compensation ranges from $22,000 to $35,000 depending on experience.

Ideal candidates will have:

- Undergraduate degree in Engineering, Accounting, Business, Computer Science.
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- 2-7 years experience in major computing environment.
- CDP highly desirable.
- COBOL Programming experience.
- Industry experience in Governmental, Banking, Manufacturing, Health Care or Financial Systems.

Positions available in most major cities. Client offers outstanding benefit and rapid advancement potential. Interviewing and relocation expenses will be paid.

Send detailed resume with compensation requirements and 3 preferred city locations to search consultants, CW Box 1494, 797 Washington St., Newton, MA. 02160 or call (415) 433-0535 or (714) 759-0515.

SYSTEMS PROGRAMMER

The Regional Information Systems (RIS) located at Eugene, Oregon is looking for a systems programmer who has actual experience in systems generation, implementation and maintenance of MVS. Experience in JES 2, TP and DBMS a plus. RIS is a cooperative data processing center dedicated to providing services to the county and other local government agencies. The current hardware configuration includes an IBM 158, 155 and over 200 terminals and RJE stations. Salary starting up to 21,700. Please send resume to: **Lane County Personnel Department, 2nd Floor Public Service Building, 125 East 8th Ave., Eugene, OR 87401.**

COMPUTER SCIENCE

An imaginative and innovative teacher for introductory courses with applications in various disciplines. MBA with strong computer programming background or MS in Computer Science with strong business background preferred. Salary and rank open and competitive. Findlay College, located in a secure medium-sized town in NW Ohio, provides ideal support for professional, intellectual, and academic pursuits. Faculty emphasis is on excellence in teaching. Application deadline April 15. Send vitae and credentials to W. J. McBride, V.P. for Academic Affairs, Findlay College, Findlay, Ohio 45840. Equal Opportunity Employer.

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PACIFIC NORTHWEST

System Analysts 17-20K
3 plus yrs. exp., much user contact COBOL, DOS or OS.

Prog Analysts 14-19K
1 plus yrs. exp: Financial, Mfg. Ins., Retail, Medical, COBOL and/or RPG II.

Systems Progs 22-25K
OS, IMS, Internals, Assembler.

The above represents a sampling of the excellent positions available to you in the Northwest.

All inquiries will be held in strictest confidence. All fees employer paid.

Houser, Martin, Morris & Assoc.
(206) 455-9600
1621-114th S.E., Suite 215
Bellevue, WA 98004

PROGRAMMER/ANALYST

Immediate opening for Programmer/Analyst at Ulster County Community College.

Minimum qualifications include 2-4 years COBOL and DOS/VS experience. Knowledge of administrative applications in an educational environment a definite plus. B.S. degree preferred. Individual will be working with an on-line system (CICS) and will be expected to work with various campus offices in the development and maintenance of their applications. Starting salary range $13,500 to $15,000.

Please send resume to Director of Computer Center, Ulster County Community College, Stone Ridge, NY 12484 no later than March 27, 1978. *EOE/AA*

Management Methods

ANALYST POSITION

An Academic/Professional appointment as Project Coordinator to develop and install Library Control System for multi-campus environment. Degree in data processing or library automation, or equivalent data processing experience required. IBM JCL and utilities, IBM 360 Assembler or PL-1. Salary $17,000-$20,000. Application, resume, names/addresses of three references, by March 10, 1978 to Larry J. Smith, Office of Administrative Information Systems and Services, 54 Administration Building, University of Illinois, Urbana, Illinois 61801, telephone (217) 333-4831. Position available o/a April 1, 1978.

The University of Illinois is an Affirmative Action/Equal Opportunity employer, and encourages applications from minority groups and women, as well as handicapped persons and veterans.

MANAGER QUALITY ASSURANCE

Texas, the energy capital of the country. Large Petro company. Review plans and make recommendations to management to better utilize large IBM 370 OS equipment. Analyze development projects for quality and complete specs. Tremendous potential.
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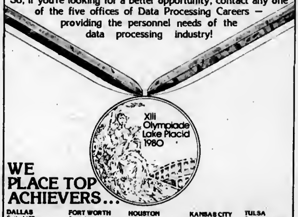

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Suite 960E
4615 Southwest Frwy
Houston, TX 77027
(713)960 9102

KANSAS CITY
Suite 502
6405 Metcalf
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2624 East 21st St
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Senior Programmer/Analyst

Bechtel, a world leader in the engineering construction industry, has an immediate opening in San Francisco for a programmer analyst to work on the development of a computerized isometric drawing system. This individual will work as a member of the project team responsible for analysis, system design, program design and implementation.

The qualified candidate will have at least 4 years' experience as a programmer/analyst on large developmental projects. A minimum of 2 years' experience in the computerized graphics area is required. Knowledge of Cobol, Fortran and Structured Programming is preferred and a degree in engineering is desirable.

Please call **K. David Bates** (collect) at **(415) 768-5942** or write immediately to:
K.D. Bates, Bechtel Corporation,
Employment Dept. 15-6B-8,
P.O. Box 3965, San Francisco,
CA 94119.

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BECHTEL

★★

COMPUTATION CENTER DIRECTOR

CARNEGIE-MELLON UNIVERSITY
PITTSBURGH, PA.

Carnegie-Mellon University is seeking a Director of its Computation Center. This department provides information processing services to educational, research, and administrative users throughout the campus. The Director reports to the Vice Provost for Information Services and has the management responsibility for operations, systems programming, and engineering activities such as the installation of new computing equipment.

Candidates should have broad management experience, in-depth technical knowledge, and a thorough understanding of the complexities of university administration. A Ph.D. is desirable but not required. Salary will depend on qualifications and experience. Send vita to the Chairman of the Search Committee: Dr. John W. McCredie, Vice Provost for Information Services, Carnegie-Mellon University, Pittsburgh, PA 15213.

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BANKING

Reserve · Personnel specializes in the placement of data processing and other professionals in banking. The following positions are all with major midwest banks and offer full utilization of talents and growth opportunities. Internal consultants-some IMS Exp . . . to $26,000. ATM-All Levels, including data comm. spec . . . to $27,000. Respond in confidence to Rich Bruening,

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2805 Butterfield Rd.
Oak Brook, IL 60521
(312) 654-3480
(Pvt. Emply. Agency)

Programmer

Must have at least one year experience with Cobol. Environment consists of 370/145 (dos/vs and cics) Health Care or City/County Applications Experience Beneficial. Submit resume to: Hens J. Kuss, Director Computer Services, Illinois Valley Community College, R.R. 1, Oglesby, IL 61438 (815) 224-6438.

PROGRAMMERS

We need several information systems professionals to help us develop a new generation of systems. The basic hardware/software configuration is IBM 370/138, DOS/VS, POWER, CICS, DL/1, VSAM, SPM 11, Assembler and COBOL.

Our management approach is people-oriented with a strong emphasis on planning for continued growth in a wide range of medical and financial applications. Successful candidates for these programming positions will perform a complete scope of program development activities including logic design, instruction coding, documentation, program testing and user education.

We will select individuals based on employment background, work experience and education. Minimum qualifications include an Associates degree and 2 years experience. Contact:

W.M. Jones
Harper-Grace Hospitals
Harper Hospital Division
Human Resources Department
3990 John R., Detroit, Michigan 48201
(313) 494-8082

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D.P. MANAGER

To $30,000. Mid-South client seeks "hands-on" decision maker to set up D.P. Center, select equipment & systems. 5-10 yrs exp medium to large shop. Must be "promotable" within short period of time. Females & minorities encouraged to respond.

SR ANALYSTS

To $23,000. Blue chip Florida clients seek professionals able to define, lead & implement projects. No programming but must have "track record" and know Project Mgmt. Excellent career oppty within these growing firms located near the ocean.

EDP AUDITORS

$15-25,000. Prestigious Atlanta "Big 8" accounting firm seeking individuals looking forward to the challenge and excitement of dealing with many diversified client companies. Degree desirable, 1-5 yrs exp, COBOL, RPG II. Highly visible positions with excellent growth potential.

SALES REPS

$20-22,000 base, $25-40,000 possible first year. Local clients seek mini-computer reps. Supplementary $ (not a draw) while training. 3-5 yrs EDP sales background, degree preferred, familiar with minis. Rewarding career opportunities in Atlanta & other desirable S.E. locations. All are sound companies projecting 50-70% total growth in 1978.

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47 Perimeter Center East, N.E.
Atlanta, GA 30348

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Software commission salesmen or rep organizations to sell marketing models all territories USA.

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MANAGER COMPUTER CENTER OPERATIONS

Immediate opening for highly skilled professional with 3-5 years managerial experience in computer operations. Our ideal candidate will have experience in 7 day on-line multiple vendor operations. Degree in computer science, hardware planning experience and applications programming knowledge strongly preferred. Excellent human relations skills and supervisory ability a must.

We offer excellent compensation, benefit package and advancement opportunity in a growth-oriented, creative enviroment. To apply send confidential resume including salary history to:

Kay Coop
Sr. Personnel Representative
Federal Express Corp.
AMF Box 30167
Memphis, TN. 38130

Equal Opportunity Employer M/F

COMPUTER PROGRAMMER III

(14,520 - $19,212). Responsible for designing and writing applications programs for on-line library circulation system; also, writing documentation and instructions manuals for system. Excellent skills in PL/I and BAL essential; experience with PDP11, VS, VM or MVS desirable. Bachelor's degree (or equivalent), preferably in computer science, with two years experience. Library experience, particularly with OCLC and MARC records helpful. Apply to: William C. Horner, D.H. Hill Library, P.O. Box 5007, N.C. State University, Raleigh, N.C. 27650. An Equal Opportunity/Affirmative Action Employer.

M.I.S. MANAGEMENT OPPORTUNITY

- Mid-Atlantic Location
- Dynamic Billion Dollar Corporation
- Attractive Compensation Package

Qualified candidates will have current managmenet experience involving large IBM 370 systems, with proven track record in systems planning and organization, systems programming, and facilities management. For consideration, send resume to:

Scientific Placement, Inc.
Employment Service
2700 S. Post Oak Rd., Dept. 73
Houston, Texas 77056
(713) 621-9811

COMPUTER SERVICES ADMINISTRATOR OREGON

Salary—$20,304—$26,508

Requirements: College degree plus five (5) years professional experience in computer based systems design or operation, including two (2) years supervisory level. Preference given to experience with Burroughs on-line terminal applications and RJE environment.

Request application from: Personnel Department, Clackamas Community College, 19600 South Molalla Avenue, Oregon City, Oregon (503) 656-2631, Ext. 318.

PROGRAMMER ANALYST

Are you an experienced programmer with exceptional career motivations and interest in expanding into P/A with 370-148 Data Base Manufacturing applications. For confidential consideration, forward resume or call Vick Anderson, E.D.P. Specialist, Snelling and Snelling, 1415 Directors Row, Suite 12A, Fort Wayne IN 46808 (219) 482-1511. Licensed Employment Agency.

PROGRAMMER/ ANALYST To $23K

Rapidly expanding PHILADELPHIA area consulting firm seeks multi-faceted EDP pro w/2+ yrs design, development & modification of varied commercial systems. COBOL proficiency from lge scale IBM environ essential. Knldg RPG II & BAL highly pfd. Exciting career oppty w/real potential for growth into mgmt.

For immediate confidential attention, please call or forward resume to:

ROBERT HALF
PERSONNEL AGENCIES
2 Penn Center Plaza
Suite 706
Philadelphia, PA 19101
(215) 568-4580

SYSTEMS/PROG. MANAGER

Enjoy Blue Grass County living in a University influenced cultural environment. Challenging position with Ky's fastest growing computer co. Selectee will manage staff of 10-12 for implementation of new bank applications including On-Line CIF and Teller Terminals. IBM COBOL, ALC, DOS and online experience desired. Salary up to $24K based on qualifications. Other Analyst/Prog. positions available. Submit resume to Duane Robinson, MatriData Computing, Inc., P.O. Box 1748, Lexington, KY 40507.

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Tenure Track Position, beginning September 1978 in Computer and Information Processing. Qualifications: graduate degree in computer field or in business field with experience in computer applications. Teaching experience and earned doctorate preferred but not required. Responsibilities include halftime teaching/halftime computer center services to the academic needs of the college. B.S.C. has a new, expanding computer degree program. Involved in conversion to interactive computing equipment with CAI capabilities. Salary commensurate with experience and background ($13,000 to $26,000). Contact: Dr. Norman L. Hilgar, Chairperson, Department of Business Administration, Bloomsburg State College, Bloomsburg, PA 17815, by April 1, 1978.

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STAFF ASSISTANT/ APPLICATIONS PROGRAMMER

The successful applicant will work under the general supervision of the Associate Director for User Services. He/she will have responsibility for some of the standard packages, system or library programs supported by the center and will act as liaison person with various groups within the University on given projects. Salary commensurate with experience. Send resume to Charles D. Lyman, University Computing Center, University of Massachusetts, Amherst, MA 01003. The University is an Affirmative Action/Equal Opportunity Employer.

PROGRAMMER ANALYST SYSTEM 3

Due to expansion, a electro-mechnical components manufacturer has need of a qualified programmer analyst. Applicants must have a minimum of 3 or more years of experience in using a System 3. Must be familiar with manufacturing applications using RPG II. We are a rapidly growing $70 million dollar company who offers rapid advancement in a fast growing and progressive atmosphere.

An excellent salary and benefit package is being offered which includes profit sharing, dental plan, etc.

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Huntington,
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ASST/ASSOC. PROFESSOR. (Department of Computer and Information Sciences). Salary range: Dependent upon qualifications and experience. Professional experience in academic life and business will be considered in making selection and determining rank and salary. Minimum qualifications: An appropriate doctoral degree with commitement and competence as a teacher and researcher. Responsibilities: Duties will include teaching undergraduate and graduate students in Computer and Information Scineces and closely related subject areas. In addition, incumbents should engage in meaningful research, perform professional service activities, and the normal faculty duties associated with a teaching appointament. Appointment date: August 1979. This appointment is a regular probationary appointament. Application deadline: April 18, 1978. Send applications and credentials to: Mr. Charles Cochran, Chairman, Department of Computer and Information Sciences, Marshall University, Huntington, West Virginia 25701. Telephone: (304) 696-2313.

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LINCOLN NEEDS PEOPLE

Lincoln National Life, the tenth largest insurance company in the United States, is seeking competent, highly motivated Systems Programming talent to meet needs brought on by rapid growth and new technologies. Key openings include:

- Manager, Systems Programming & Software
- Systems Programming Consultant
- Systems Programming Specialist
- Senior Systems Programmer
- Systems Programmer

If you understand MVS, JES3, CICS, IMS, TSO VTAM/NCP - If you want an atmosphere where growth, initiative, and innovation is encouraged - If you are not content with yesterday solutions to tomorrow problems - We want to talk to you.

The Lincoln is prepared to offer qualified candidates challenging opportunities and an excellent compensation package including a stock purchase program and paid relocation.

If you are prepared to step forward to a rewarding career, send your resume in confidence to:

Rosalyn Smith
Managerial Recruiter
Lincoln National Life Insurance Company
1300 South Clinton St.
Fort Wayne, Indiana 46801

Storage Technology Corporation

The world's largest manufacturer of high density tape data storage products and a major manufacturer of disk subsystems and supplier of memory products has an immediate need for a

SR. BUSINESS ANALYST

Must have a verifiable track record in deriving the real business problem when faced with a profusion of symptoms, and proven ability to translate problem definitions into operational or systems solutions. Willingness to roll-up sleeves and execute solutions a must.

Should be strong in defining manual procedures and selectin cost effective solutions from among the multitude of automated options available.

Must have experience with the following:

- PROJECT MANAGEMENT
- COST BENEFIT ANALYSIS
- ACCOUNTING APPLICATIONS
- LARGE COMPUTERS
- MINI COMPUTERS
- DATA COMMUNICATIONS
- HARDWARE & SOFTWARE SELECTION
- SYSTEMS ANALYSIS

A Degree and significant experience in a profit-oriented business environment is absolutely a must.

We offer an excellent salary including health and insurance benefits, stock purchase and retirement plan. Please send resume to:

STORAGE TECHNOLOGY CORPORATION
2270 South 88th Street,
Louisville, Colorado 80027

We are an equal opportunity employer M F

IMS PROGRAMMER ANALYST

We are growing and we need qualified professionals who are willing to learn and grow with us. If you know or are interested in learning IMS/DB-DC and have two plus years of paid experience in the development of Application Systems in a multi programming environment utilizing COBOL, O/S we would like to hear from you

We provide a challenging environment, with opportunities for advancement as well as liberal fringe benefits

For immediate consideration send resume in confidence, including salary history to

Division of Personnel
Administrative Services Building
RUTGERS UNIVERSITY
New Brunswick, New Jersey 08903

An Equal Opportunity/Affirmative Action Employer-M/F

DATA ENTRY (KEYPUNCH)

Requires minimum of eight years recent, relevant, full time work experience as a data entry operator of a buffered keypunch machine, key-to-diskette machine, familiarity with programmable and interactive data entry equipment and one year supervisory experience in data entry operations. Desirable experience includes: related teaching experience at the post-secondary level, knowledge and experience with occupational advisory committees and curriculum development. Also desirable to have additional post secondary operation and skill development training in specialized and unusual data entry and related areas. Minimum of associate degree will be required for those faculty renewed through the end of the fifth contract year. To be considered for the above position, please send a complete resume including position applied for, education, professional teaching experience, allied work experience, specialized training, and other information pertinent to the requirements and preferences of the position to the office listed below. Documentation supporting resume information will be required when and if candidates are submitted for possible employment.

PIMA COUNTY COLLEGE
Faculty Personnel Office
AL-2B
2202 W. Anklam Rd.
Tucson AZ 85788
(602) 884-6820

Equal Opportunity Employer M/F

EDP/TC Training Specialist

This challenging position provides an unusual opportunity to combine EDP and training knowledge to contribute to the growth and effectiveness of our national health care telecommunications system. Major responsibilities include development and instruction of EDP/TC related education training programs.

Requirements include current knowledge of state-of-the-art distributive systems and experience with implementation including development of formal training programs for users and operations people, as well as excellent writing skills, good oral and human relations skills, and a college degree.

We are headquartered in downtown Chicago and offer an excellent salary and outstanding company paid benefits. Send resume including salary history, in complete confidence, to:

Roberta M. Taillon
Blue Cross Association
500 N. Michigan Ave.
Chicago, IL 60611

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Purdue University's laboratory for applications of remote sensing (Lars) has openings for experienced system analysts/programmers interested in the apilcations of computers to national and international earth resources problems. Responsibilities include development implementation and maintenence of software systems and specialized hardware systems.

Qualifications: B.S. or M.S. in an area relating to digital computer systems. Familiarity with medium/large scale computer hardware and supervisory software design and implemementation. Familiarity with assembler language programming, system programming, system design and documentation. Management skills desired.

Forward resume to Terry L. Phillips, Lars 1220 Potter Drive, W. Lafayette, IN 47906. Equal Opportunity/Affirmative Action Employer..

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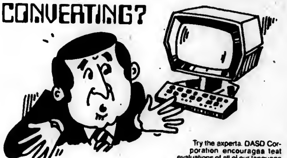

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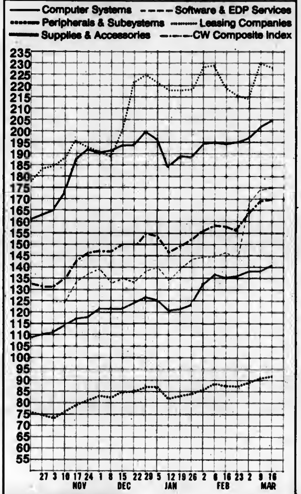
COMPUTERWORLD Computer Stocks Trading Indexes



Earnings Reports

PLANNING RESEARCH

Three Months Ended Dec. 31

	1977	1976
Shr Ernd	$.15	$.13
Revenue	52,125,000	45,636,000
Earnings	1,018,000	a792,000
6 Mo Shr	33	.30
Revenue	100,815,000	88,466,000
Earnings	2,255,000	a1,850,000

a-Includes after-tax loss of $17,000 in the quarter on sale of subsidiary. Results for six months include after-tax gain of $157,000 on similar transaction.

QUOTRON

Year Ended Dec 31

	1977	a1976
Shr Ernd	$1.28	$.85
Revenue	33,353,384	24,642,872
Tax Cred	2,268,154	1,463,533
Earnings	4,650,574	2,781,729
3 Mo Shr	29	28
Revenue	8,898,034	7,146,062
Tax Cred	372,181	517,271
Earnings	1,198,195	1,048,468

a-Restated

RAPIDATA

Year Ended Dec 31

	1977	1976
Shr Ernd	$.50	$.28
Revenue	17,812,681	15,825,839
Earnings	a899,441	510,877
3 Mo Shr	.14	.16
Revenue	4,473,558	4,140,501
Earnings	240,295	181,322

a-Includes $181,812 net gain on sale of certain assets.

UNITED TELECOMMUNICATIONS

Year Ended Dec. 31

	1977 (000)	1976 (000)
Shr Ernd	$2.31	$2.01
Revenue	1,191,164	1,005,125
Disc Op Loss	3,153	534
Earnings	134,260	112,574
3 Mo Shr	.51	.56
Revenue	315,827	262,529
Disc Op	(684)	284
Earnings	33,877	30,965

a-Restated.

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Bill Healey
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Bill Healey
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Judy Milford
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Japan
Mr. Shigema Takahashi
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United Kingdom
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8000 Munich 40
Tristanstrasse 11
West Germany
Phone: (089) 36-40-36
Telex: W.Ger-5-215250-HKFD

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, MARCH 13, 1978

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		PRICE 1977-78 RANGE (1)	CLOSE MAR 13 1978	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	22- 33	49 3/8	+2 7/8	+[illegible].1
N	BURROUGHS CORP	33- 91	60 5/8	-1 1/8	-1.8
O	COMPUTER AUTOMATION	18- 50	24 1/8	+ 1/8	+0.3
N	CONTROL DATA CORP	20- 29	24 7/8	+ 3/4	+3.1
O	CRAY RESEARCH INC	15- 51	28 1/2	+ 3/4	+2.9
N	DATA GENERAL CORP	35- 34	43 7/8	+1 1/8	+2.8
N	DATAPOINT CORP	18- 41	40 1/4	+1 7/8	+4.8
N	DIGITAL EQUIPMENT	37- 53	39 1/4	-1 1/4	-3.0
N	ELECTRONIC ASSOC.	2- 4	3 3/8	- 1/2	-12.1
A	ELECTRONIC ENGINEER.	8- 18	13	+ 1/8	+0.9
O	FOUR-PHASE SYSTEMS	13- 23	22	+ 1/4	+1.1
N	FOXBORO	28- 54	29 3/4	+ 1/2	+1.7
O	GENERAL AUTOMATION	6- 9	8 1/8	+ 3/8	+4.8
O	GRI COMPUTER CORP	1- 1	1 1/4	+ 1/8	+11.1
N	HEWLETT-PACKARD CO	[illegible]3- 87	82 1/2	-1 7/8	-2.9
N	HONEYWELL INC	43- 55	44 5/8	+ 5/8	+0.8
N	IBM	239-286	240 1/8	-6	-2.4
O	MANAGEMENT ASSIST	5- 12	11 1/2	+1 1/8	+10.8
O	MICRODATA CORP	7- 18	12 3/4	- 1/8	-0.9
O	MINI-COMPUTER SYST	5- 12	5 3/4	- 3/4	-11.3
O	MODULAR COMPUTER SYS	5- 11	10 1/2	+ 1/2	+5.0
N	NCR	32- 47	42 1/4	+1 3/8	+3.3
C	PRIME COMPUTER INC	12- 28	27 3/4	+2 1/2	+9.9
N	PERKIN-ELMER	17- 22	18 3/8	+ 1/8	+0.[illegible]
N	RAYTHEON CO	16- 35	54 3/8	+ 5/8	+1.8
N	SPERRY RAND	30- 42	34 7/8	+ 1/2	+1.4
O	SYCOR INC	8- 21	20 1/2	+ 5/8	+1.8
A	SYSTEMS ENG. LABS	5- 14	13 1/4	- 1/4	-1.8
A	WANG LABS.	10- 13	14 1/2	+1 5/8	+12.6

LEASING COMPANIES

EXCH		PRICE 1977-78 RANGE (1)	CLOSE MAR 13 1978	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALANTHUS CORP	3- 6	5 3/4	0	0.0
C	BOOTHE COURIER CORP	8- 1[illegible]	1[illegible] 1/8	+ 1/8	+0.7
O	COMDISCO INC	9- 18	9 1/2	+ 1/4	+2.7
A	COMMERCE GROUP CORP	1- 3	5/8	- 3/4	-34.5
A	COMPUTER INVSTRS GRP	1- 2	5/8	0	0.0
N	DATRONIC RENTAL	0- 2	1 1/2	+ 1/4	+20.0
A	DCL INC	1- 4	3 1/8	- 1/8	-5.8
N	DPF INC	6- 10	8	+ 1/8	+1.3
N	ITEL	13- 22	17 1/2	+ 3/4	+4.4
N	LEASCO CORP	19- 29	29 3/8	+1 1/8	+3.9
O	LEASPAC CORP	1- 2	1 1/2	+ 1/8	+9.0
A	PIONEER TEX CORP	5- 11	5 7/8	+ 1/4	+4.4
N	U.S. LEASING	10- 1[illegible]	15	+ 1/4	+1.9

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & EDP SERVICES

EXCH		PRICE 1977-78 RANGE (1)	CLOSE MAR 13 1978	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	0- 2	1 1/2	0	0.0
O	ANACOMP INC	7- 12	11 1/4	- 7/8	-7.2
A	APPLIED DATA RES.	5- 10	9	- 3/8	-4.0
N	AUTOMATIC DATA PROC	23- 30	28 7/8	+2 3/8	+9.[illegible]
O	COLEMAN AMERICAN COS	1- 2	7/8	- 3/8	-30.0
O	COMPU-SERV NETWORK	9- 13	8 3/4	- 3/4	-7.8
C	COMP ELECTION SYSTMS	6- 10	9 1/4	+ 1/4	+2.7
C	COMPUTER HORIZONS	1- 2	2 1/4	0	0.0
O	COMPUTER NETWORK	6- 11	8 1/4	0	0.0
N	COMPUTER SCIENCES	7- 10	9 5/8	+ 3/8	+7.1
O	COMPUTER TASK GROUP	1- 2	1 3/4	0	0.0
O	COMPUTER USAGE	1- 3	1 3/4	0	0.0
O	COMSHARE	5- 9	8 3/4	+ 3/4	+9.3
O	DATA DIMENSIONS INC	5- 3	3	- 1/8	-2.4
O	DATATAB	1- 2	1 1/4	0	0.0
N	ELECTRONIC DATA SYS.	14- 20	18 7/8	+ 1/2	+2.7
O	INSYTE CORP	2- 3	1 3/8	0	0.0
C	IPS COMPUTER MARKET.	1- 2	2 1/4	0	0.0
O	KEANE ASSOCIATES	3- 4	3 1/2	0	0.0
O	KEYDATA CORP	1- 3	1 3/8	+ 1/4	+18.1
A	LOGICON	7- 17	12 7/8	+ 1/4	+1.9
A	MANAGEMENT DATA	1- 2	1 1/8	0	0.0
A	NATIONAL CSS INC	10- 18	1[illegible] 3/8	+ 7/8	+3.8
O	NATIONAL DATA CORP	4- 8	7 3/4	- 1/4	-5.1
O	ON LINE SYSTEMS INC	18- 24	22 3/8	- 1/4	-1.1
N	PLANNING RESEARCH	3- 6	4 1/4	- 1/4	-5.3
O	PROGRAMMING & SYS	1- 1	3/4	0	0.0
O	RAPIDATA INC	2- 4	4	+ 3/4	+23.0
O	REYNOLDS & REYNOLDS	17- 21	17 3/4	- 1/4	-1.3
O	SCIENTIFIC COMPUTERS	1- 4	3 3/8	+ 1/8	+3.8
O	TYMSHARE INC	14- 23	19 1/2	+ 1/8	+0.[illegible]
A	URS SYSTEMS	4- [illegible]	[illegible]	+ 1/8	+2.1
N	WYLY CORP	1- 3	2 3/4	- 1/8	-4.3

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1977-78 RANGE (1)	CLOSE MAR 13 1978	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	10- 18	17 3/4	+ 1/8	+0.7
O	ADVANCED MEMORY SYS	7- 9	8 3/4	+ 1/8	+1.4
N	AMPEX CORP	8- 13	12 1/4	0	0.0
O	ANDERSON JACOBSON	3- 6	5 1/4	+ 1/8	+2.4
N	APPLIED DIG DATA SYS	10- 20	13 7/8	+ 3/8	+4.7
O	BEEHIVE INT'L	3- 12	3 7/8	+ 1/8	+2.1
A	BOLT, BERANEK & NEW	6- 9	3 3/4	+ 1/8	+2.2
N	BUNKER-RAMO	8- 15	12 1/2	+ 3/4	+6.5
A	CALCOMP	3- 5	5 7/8	0	0.0
O	CAMBRIDGE MEMORIES	1- 4	2 3/4	+	+2.5
N	CENTRONICS DATA COMP	18- 30	18	- 1/4	-1.3
C	COGNITRONICS	1- 1	7/8	0	0.0
O	COMPUTER COMMUN.	5- 8	8 7/8	+ 3/4	+9.2
O	COMPUTER CONSOLES	4- 7	5 3/4	- 1/4	-[illegible].2
A	COMPUTER EQUIPMENT	2- 4	4	+ 1/8	[illegible]
O	COMPUTER TRANSCEIVER	1- 1	1 3/8	- 1/8	-8.3
O	COMTEN	9- 15	13 5/8	+ 1/8	+0.9
N	CONRAC CORP	19- 28	19 5/8	+ 3/8	+1.9
O	DATA ACCESS SYSTEMS	4- 5	5	+ 1/4	+5.2
O	DATA 100	[illegible]- 12	11 1/2	+1	+9.3
A	DATA PRODUCTS CORP	9- 19	13 3/8	+ 5/8	+2.4
O	DATA TECHNOLOGY	3- 4	4 1/4	+ 1/8	+3.0
O	DATUM INC	1- 5	2 3/8	+ 1/8	+5.0
O	DECISION DATA COMPUT	2- 3	1 3/4	0	0.0
O	DELTA DATA SYSTEMS	1- 1	3/8	0	0.0
A	DOCUMATION INC	6- 12	10 3/8	0	0.0
O	DATARAM CORP	2- 24	15 3/4	-2 1/4	-12.3
N	ELECTRONIC M & M	4- 5	4 1/2	+ 1/4	+5.8
O	FABRI-TEK	1- 2	1	-	-3.5
O	GENERAL COMPUTER SYS	0- 2	1 5/8	0	0.0
N	HAZELTINE CORP	8- 13	13 1/8	+1 1/8	+9.5
N	HARRIS CORP	28- 47	45 3/4	+1 1/8	+2.5
O	INFOREX INC	4- 8	7 1/2	- 1/2	-[illegible].2
O	INFORMATION INTL INC	8- 14	8 3/4	+ 3/4	+9.3
O	INTEL CORP	38- 57	40 1/2	0	0.0
A	LUNDY ELECTRONICS	3- 6	4	0	0.0
O	MSI DATA CORP	[illegible]- 13	13 3/8	+ 1/8	+0.9
O	MEMOREX	23- 34	28 1/2	0	0.0
N	MOHAWK DATA SCI	3- 8	7 7/8	- 1/8	-1.3
O	RENRIL CORP	2- [illegible]	3 3/8	0	0.0
N	PERTEC CORP	7- 11	10	+ 7/8	+9.3
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 2	2	0	0.0
O	QUANTOR CORP	3- 5	5	- 3/8	-11.1
O	RECOGNITION EQUIP	6- 10	7 7/8	+ 1/4	+3.2
O	SCAN DATA	1- 2	1 3/8	0	0.0
O	STORAGE TECHNOLOGY	10- 27	26 7/8	+1 7/8	+7.5
O	T BAR INC	7- 1[illegible]	14	-1 3/4	-11.1
O	TALLY CORP.	4- 8	7 1/2	+ 3/8	+3.2
A	TEC INC	6- 10	6 3/8	+ 1/4	+5.9
N	TEKTRONIX INC	29- 40	33 5/8	+2 1/8	+[illegible].3
N	TELEX	2- 4	5 5/8	- 1/8	-3.5
O	TESDATA SYSTEMS CP	13- 20	13 1/2	- 1/4	-1.8
O	WILTEK INC	1- 1	3/8	0	0.0

SUPPLIES & ACCESSORIES

EXCH		PRICE 1977-78 RANGE (1)	CLOSE MAR 13 1978	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	6- 8	7 5/8	0	0.0
O	BALTIMORE BUS FORMS	1- 4	2 1/4	0	0.0
A	BARRY WRIGHT	10- 19	17 3/4	+ 3/4	+4.4
O	CYBERMATICS INC	1- 1	7/8	0	0.0
O	DUPLEX PRODUCTS INC	14- 20	19	- 3/8	-1.9
N	ENNIS BUS. FORMS	6- 11	9 7/8	- 3/8	-5.6
O	GRAPHIC CONTROLS	13- 39	38	-1	-2.5
N	3M COMPANY	45- 5[illegible]	43 5/8	+ 1/2	+1.1
O	MOORE CORP LTD	24- 37	29 1/4	0	0.0
N	NASHUA CORP	1[illegible]- 28	22 3/4	0	0.0
O	STANDARD REGISTER	18- 23	22 1/4	+ 3/4	+3.4
O	TAB PRODUCTS CO	8- 19	8 3/8	+ 5/8	[illegible]
N	UARCO	18- 22	21 3/4	+ 3/4	+3.5
A	WABASH MAGNETICS	10- 15	11 1/4	+1 1/4	+12.5
N	WALLACE BUS FORMS	17- 21	20	+1	+5.2

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